FEDERAL HIGHWAY PROGRAM NEEDS: REVENUES AND COST ALLOCATION ISSUES

HEARINGS

BEFORE THE

SUBCOMMITTEE ON TRANSPORTATION

OF THE

COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

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FEDERAL HIGHWAY PROGRAM NEEDS: REVENUES AND COST ALLOCATION ISSUES

TUESDAY, AUGUST 10, 1982

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON TRANSPORTATION,
Washington, D.C.

The subcommittee met at 2:08 p.m., in room 4200, Dirksen Senate Office Building, Hon. Steve Symms (chairman of the subcommittee) presiding.

Present: Senators Symms, Stafford, Abdnor, and Randolph.

OPENING STATEMENT OF HON. STEVE SYMMS, U.S. SENATOR FROM THE STATE OF IDAHO

Senator SYMMS. The subcommittee will now come to order.

I wish to welcome the witnesses who will be testifying before the Subcommittee on Transportation of the Full Committee on Environment and Public Works. Today's hearing and its continuation next week will focus on Federal highway needs and how they can be addressed in view of existing revenues, and the allocation of highway costs among the various users of our highways.

The subcommittee has asked the witnesses to provide testimony on a number of important issues which will assist it in making recommendations to the Finance Committee on highway revenues and the continuation of the highway trust fund. These legislative initiatives will have an important effect on how well the Federal-aid highway program will address the needs of our transportation system in the future.

Our witnesses today have been asked to address the following issues: The condition of the Federal-aid highway system and factors affecting the service life of the system; the needs of the Federal-aid highway system versus the existing revenues coming into the highway trust fund; the allocation of highway costs among the various highway user classes; and proposals to change the structure of existing highway user fees.

The subcommittee is very concerned about the condition of our highway system as well as the need to complete the Interstate Highway System. The latter item was the subject of a report—"The Interstate Highway System: Issues and Options"—recently completed by the Congressional Budget Office. According to this report, mounting repair needs, escalating completion costs and declining financial resources are all contributing toward making completion of the Interstate System an unattainable goal.

The cost to complete the remaining 1,575 miles of the Interstate System is estimated at $39 billion in 1979 dollars. At the same time, much of the existing system is badly in need of repair. The report states:

> Completion of all the construction, reconstruction and repair projects that qualify for federal support under current programs would require an increase in annual authorizations of $8 billion. This is more than double the current program level. The report goes on to say that to support such an increase we would have to nearly triple the current four cents a gallon gas tax.

The condition of the highway infrastructure has received much attention recently. At our subcommittee hearing last April, I referred to an article by George Will on "What Potholes Say About Us." Mr. Will in his article indicated that system "maintenance as well as original construction is a measure of a society's vitality. It is also a measure of maturity, of the willingness to make timely provisions for the future. By this measure, America is increasingly deficient." This article is as valid today as it was last April.

While last winter's potholes may have been temporarily filled, the deterioration of our Nation's highway system continues. Newsweek magazine recently did a feature story on the "Decaying of America," which recounts the problems of our highway system and notes the cost to Americans of our decaying physical plant. The article states that:

> In Houston, for example, city planners estimate that motorists pay a "traffic congestion tax" of $800 a year in time and gasoline wasted on the city's snarled expressways.

TRIP, the road information program, estimates that bad roads cost the private sector upwards of $30 billion annually for everything from broken axles to lost business.

Last year the Government Accounting Office completed a report on "Deteriorating Highways and Lagging Revenues." The report again cited the deterioration of our Nation's highways, particularly the Interstate System, and the need for billions of dollars to solve the problem. The report goes on to say that if the problem is not addressed in a timely manner, it will cost even more.

This theme is one of increasing concern to the subcommittee. We have a number of witnesses scheduled to testify on pavement and bridge wear, and we hope to learn more about the causes of highway deterioration and some of the implications of deferred maintenance.

While the subcommittee intends to look at highway needs versus highway revenues, the second major objective of these hearings will be to receive testimony on the Federal Highway Administration's May 1982 "Final Report on the Federal Highway Cost Allocation Study." This report was mandated by the Surface Transportation Assistance Act of 1978 for the purpose of reviewing the allocation of Federal highway program costs among the various highway user classes. The Secretary of the Treasury was directed to prepare a companion report on the administration and enforcement of highway trust fund taxes. We understand that Treasury's report will be completed soon.

I have supported an increase in the Federal highway gas tax as one way of providing urgently needed revenues through highway user fees, to support the expeditious completion of the Interstate System and to rebuild existing Federal-aid highways and bridges.

The findings of the highway cost allocation study indicate that certain highway user classes are paying more than their cost responsibility and others are paying less. Specifically, the study shows that there is a need to increase heavy vehicle user taxes, especially for large trucks. The subcommittee staff has developed three alternative proposals for discussion purposes only. I want to emphasize that none of these alternatives have been endorsed by the committee or any member of the committee.

I commend the administration in addressing the very complicated and difficult subject of highway cost allocation in a straightforward manner. While I understand that there are different viewpoints, the report provides an excellent body of knowledge for the discussion of the issues. I look forward to discussing these issues in greater detail during the hearing.

I know that Senator Bentsen, the ranking minority member of the subcommittee, is tied up in conference and is unable to be here.

I note that Senator Abdnor and Senator Randolph are here. Do you have an opening statement, Senator Abdnor?

OPENING STATEMENT OF HON. JAMES ABDNOR, U.S. SENATOR FROM THE STATE OF SOUTH DAKOTA

Senator Abdnor. No formal statement, Mr. Chairman, I want to commend you for holding these hearings. I don't know of any subject that crosses State lines to any greater degree than highway construction and maintenance. We may quibble about how we ought to prorate dollars back to our States, but there is no doubt that all States are in dire need of additional funds to do the job that needs to be done. Each day, each week, each month that goes by, the job we have to do gets greater. So I commend you for taking this issue up. I hope we can get some answers.

Senator Symms. I thank you for your support of the Federal highway program.

We have one of the ardent highway supporters in America right here, the former chairman of this committee, Senator Randolph. I think he has opening remarks to make.

OPENING STATEMENT OF HON. JENNINGS RANDOLPH, U.S. SENATOR FROM THE STATE OF WEST VIRGINIA

Senator Randolph. Thank you very much, Mr. Chairman. The word commend has been used at least two or three times this afternoon, so I will change my commendation to my congratulations to you because you are beginning a series of hearings by the Subcommittee on Transportation, a subcommittee you ably chair, focused on highway needs, which include bridges as well as highways, and financing alternatives.

It has been documented that our need for new construction and rehabilitation of our highways, including, as I have said, bridges, is growing as more mileage deteriorates and as construction costs increase.

I think we recognize that we have been witnesses to a recent phenomenon in that bid prices have come in lower than estimates.

But this reflects the general state of the economy, in the short run rather than in a long-range trend.

Across the Nation we are in a period of rapid deterioration of our road system. A system that should carry those loads and not show that deterioration for a number of years. Frankly, the repairs that have been taken are not of a permanent nature.

So, as you and your colleagues on this committee will document the new and urgent needs, we will have those persons from the Finance Committee hopefully appropriate levels of taxes for the highway trust fund and the allocation of costs among the various user classes.

I believe that it is very, very important that in our committee we consider the allocation of costs among the various classes of users.

In 1978, I recall, the Congress authorized the highway cost allocation study. That report has been submitted to the Congress and has been reviewed by many members intensely interested in the well-being of our highway program. Major groups affected by this report will, I am sure, testify among those witnesses to be heard at the hearings.

The highway trust fund receipts, as we understand, are declining. We must examine the role of the Federal Government anew in our highway program. I believe that we have commitments which we have begun over a period of years. I believe the recommendation in the Senate of S. 2574, the Federal-Aid Highway Act of 1982, is critical.

When this determination has been completed, we must provide adequate revenues—you have touched upon this, Mr. Chairman—to cover our responsibilities.

The Committee on Environment and Public Works must be involved in an integral way in setting the appropriate level of revenues in the highway trust fund to support this vital program. A review of the cost allocation study gives us the opportunity to hopefully make an intelligent recommendation to the Finance Committee for a long-term extension of the highway trust fund.

The highway trust fund has been a question that has been debated and voted on in the U.S. Senate year after year. As I recall, the last time we voted on it there were only nine votes that were in favor of doing away with the highway trust fund. So generally speaking, there is an accord on Capitol Hill that this is a good way in which to provide the funding.

The main issue on which I am sure our committee will be receiving testimony at this first hearing is the methodology used in allocating the highway costs to vehicles using these roadways. In part of this study the incremental cost method was used. Under the costs occasioned method used by the Department of Transportation in this study, a major shift in responsibility for this deterioration of which we speak was developed.

I have certainly not made up a conclusiveness in my mind as to which method is correct. I shall listen carefully as a member of the subcommittee as well as the full committee, I will try to follow these hearings and participate as fully as possible.

I do believe, however, that heavier trucks cause more damage—trucking companies would not deny that—than previously thought, and it would seem to me that there would be some reasonable share of costs that could be increased to this category of user. I say some reasonable cost.

I again state that this will be a useful hearing. Mr. Chairman, you have a big job ahead of you and others will help you. But the problems associated with the well-being of this country are in a very real sense associated with the mobility of the people of the United States, people going to and from their jobs, people with their families vacationing across this country, and, more importantly, the products of the mine, the factory, and the field moving to the consuming public in all of our States.

So the matters we consider here today are not to be delayed. I think it is the commitment certainly of you and others on this committee that we come forth with well-reasoned points, but as prompt as possible bringing together points necessary in a bill which can have the approval, hopefully, of the Congress and also the endorsement of the traveling and using public.

Senator **Symms**. I thank you very much for that statement, Senator Randolph. I appreciate your encouragement and support to help this become a reality because I think that the need is becoming more and more apparent to more and more Americans that we must get on with the program and move forward.

Now I would like to ask unanimous consent to insert into the record a statement by the chairman of the committee, who is on the floor protecting the interests of the committee, as a matter of fact, on a jurisdictional matter dealing with highways and bridges on the appropriations bill. So I ask unanimous consent to introduce Senator Stafford's statement into the record. Any other Senators who have statements will be included in the record at this point.

[Senator Stafford's statement follows:]

OPENING STATEMENT OF SENATOR ROBERT T. STAFFORD

I appreciate the opportunity to participate in these hearings and I want to extend a welcome to our witnesses.

The purpose of the hearing today is to receive testimony which will enable this committee to work towards a solution for meeting the current highway system needs which have been well documented during hearings held by this Subcommittee in the past. Highway user fees - which provide funds for the highway program - have not been increased since 1961. The Federal gas tax, which is a major source of revenue, has not been increased since 1959.

The States have responded to the crisis of a deteriorating highway system by raising State highway user fees.

At the Federal level, Highway Trust Fund receipts have been decreasing since fiscal year 1979. The cost of highway construction and rehabilitation has been increasing during this period.

As I have stated before, we must re-examine the role of the Federal government in the highway program and determine what responsibilities can best be assumed by state and local governments. Once this determination is made, the Federal government must provide adequate revenues to discharge these responsibilities.

The Environment and Public Works Committee has both authorizing and spending authority for the Federal-Aid highway program. The Senate Finance Committee has jurisdiction over the Highway Trust Fund and the excise taxes accruing to the Fund. This Committee has always worked closely with the Finance Committee in assuring that adequate revenues are available to carry out the Federal-Aid highway program. Several distinguished members of this Committee are also members of the Finance Committee, including both the Chairman and Ranking Member of the Transportation Subcommittee, Senator Symms and Senator Bentsen.

In January of 1980 the Department of Transportation released its bi-annual "Highway Needs Study", which has been very useful in documenting the condition of the highway system.

More recently, the Department of Transportation issued the "Final Report on the Federal Highway Cost Allocation Study" required by Section 506 of the Surface Transportation Assistance Act of 1978.

Congress directed the Department of Transportation to collect information in three areas:

(1) determining an allocation of Federal highway program costs among the various classes of highway vehicles occasioning these costs;

(2) assessing current Federal user charges and recommending more equitable alternatives; and

(3) evaluating the need for long-term monitoring of roadway deterioration due to traffic use and other factors.

I believe the methodology used by this study in allocating highway costs to vehicles using the highways is based on sound principles. It is an improvement over the incremental method used in the past. No one user class should be the sole beneficiary of economies of scale.

The Cost Allocation Study findings show that as a whole, car and truck classes are paying approximately their fair share. However, within the truck class, light trucks are paying significantly more than their fair share and the heavier trucks are paying less.

I know differences of opinion exist as to what causes highway deterioration. I believe, however, that the heavier trucks and the increasing numbers of these trucks in the traffic stream are responsible for a significant amount of the deterioration occurring on our roads and bridges. I believe before any further size or weight increases are considered, the allocation of user costs must be addressed.

I understand that during these hearings we will be receiving testimony from a number of pavement and bridge experts and will have the opportunity to learn more about the causes of highway and bridge deterioration. A long-term monitoring program to collect better information in this area is extremely important for future decision-making. Our information on pavement life is inadequate and if efforts to correct this aren't begun now, future decision-makers will not have any better information.

I look forward to hearing from our witnesses.

Senator SYMMS. We are delighted now to have as a witness the president of Heldenfels Bros., Inc., from Corpus Christi, H. C. Heldenfels, who is representing the Associated General Contractors of America.

I might just say that the entire text of your statement will be made a part of our record. We will ask the witnesses to do the best they can to try to stay within the 5-minute rule this afternoon, and then that will leave a little more time for questioning on the part of some of the Senators. There probably will be the problem of being interrupted with votes throughout the afternoon, so we will try to expedite as fast as possible.

Mr. Heldenfels? I see Susan Loomis is accompanying you. Please go right ahead.

STATEMENT OF H. C. HELDENFELS, PRESIDENT, HELDENFELS BROS., INC., REPRESENTING THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, ACCOMPANIED BY SUSAN LOOMIS, ASSOCIATE DIRECTOR, CONGRESSIONAL RELATIONS, THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

Mr. HELDENFELS. Mr. Chairman, members of the subcommittee, I am H. C. Heldenfels, a general construction contractor from Corpus Christi, Tex., appearing before you today in my capacity as president of the Associated General Contractors of America. Accompanying me at the witness table is Susan Loomis, associate director, congressional relations, with the Associated General Contractors of America.

Mr. Chairman, I have a statement which I would like to submit for the record at this time. My following remarks will just be a brief summary of this statement.

Senator SYMMS. Without objection.

Mr. HELDENFELS. We believe it appropriate to defer to highway user groups and organizations representing public officials on the issue of how best to allocate highway costs among user classes. As the builders and rebuilders of our Nation's highways, we consider it appropriate for us to limit our comments to the highway construction and repair needs facing this country.

I appear here today to express my alarm over the ability of this Nation to address one of the greatest challenges facing it in the 1980's and 1990's. That challenge is the unavoidable fact that America's highways and bridges—the backbone of its transportation network—are wearing out faster than they are being repaired or replaced.

Extensive hearings by this subcommittee and its counterpart in the House have presented us with many private and public sector studies, reports, and white papers. All have concluded that our highway transportation system is deteriorating, due to inadequate funding, to the point where a national crisis in mobility is fast approaching.

Those hearings have established, for example: that almost half of the Interstate System will need major repairs by 1995 and other highway systems are in even worse shape; that more than half the primary system will reach the end of its design life during the 1990's; that almost 40 percent of this Nation's bridges were built before 1940, and 45 percent of our bridges are already judged deficient; that 8,000 miles of the 42,500-mile Interstate System and 13 percent of its bridges are now beyond their engineering life and must be rebuilt; and that another 2,000 miles of this system are deteriorating each year, requiring reconstruction.

Despite these needs, all levels of government, taken together, are currently spending only half of what is needed just to keep this Nation's highways serviceable. And yet, the basic 4-cents-per-gallon Federal highway user fee has not changed since 1959 and is now worth less than a cent.

Mr. Chairman, these are frightening statements indeed, but they are statements which I believe we should all keep in mind as these hearings progress.

Regardless of the outcome of this debate over which class of highway users is, or is not, fairly contributing to the upkeep of our highway system, let us not lose sight of this basic and unavoidable fact—present levels of investment are not preserving the existing system.

Mr. Chairman, at AGC we believe that this Nation cannot stand further deterioration of its highway system. We believe that the economy can stand no more loss of productivity due to increasingly congested travelways. We believe that our citizens will tolerate no further reduction in their mobility. We believe that our defense system must include a completed, upgraded, and well-maintained National System of highways. The economy is dependent on growth, and an expanded transportation system is necessary to provide for and meet the demands of that growth.

We, therefore, take this opportunity to restate our position that the Federal-aid highway program must immediately be increased to at least $12 to $13 billion per year. We believe that is the minimum that is required now to halt the further deterioration of this Nation's highways and bridges. We urge that all proposals to change the current structure of Federal highway user fees debated before the subcommittee should, in the first instance, be measured by whether or not they raise that amount of revenue per year.

Mr. Chairman, today the construction industry is in the most depressed condition that it has been in years. Overall unemployment in the country is now over 9 percent. Unemployment in construction, however, is more than twice that level. Construction creates jobs. The road information program reports that each $1 billion dedicated to road and bridge improvements generates 26,300 direct construction jobs and 36,700 supporting or induced jobs. I suggest that an adequately funded Federal-aid highway program can easily serve as the cutting edge of any effort to increase employment.

Today many contractors are being forced to bid below cost in an effort to keep their employees working and to make equipment payments. Unfortunately, many of those contractors—the great majority of them small businesses, who even in a healthy construction market average a 2-percent profit margin—have reached the point where corporate survival is being imperiled.

Reduction in Federal-aid highway investments is aggravating a largely inadequate highway funding situation at the State level. The result is a highway construction marketplace in which more highway contractors are failing today than ever before. In addition to those that have failed, many construction contractors are simply closing their doors and going out of business. The Business Economics Division of Dun and Bradstreet reports more highway and street contractors failed in the first 6 months of 1981 than failed in the whole of either 1977, 1978, 1979 or 1980. Construction's share of the gross national product has declined from a historic 10 to 7.8 percent in 1981.

Let me close, therefore, by making the point that just as an adequately funded Federal-aid highway program can enhance the Nation's economic recovery, so too it can enhance the recovery of an industry which has a proud history of building the world's finest transportation system. Today that industry stands ready to protect our transportation system from falling into further decay.

Thank you very much.

Senator SYMMS. Thank you very much for a very excellent statement.

I see our chairman, Senator Stafford, has arrived. Senator, we put your statement in the record, but did you want to make any opening comments?

Senator STAFFORD. Thank you very much, Mr. Chairman. I have no comments beyond those in the statement you were kind enough to place in the record.

I can report that the committee's jurisdictional areas have been preserved from any encroachment due to action I was just able to take, in cooperation with Senator Andrews and Senator Chiles, on the floor of the Senate.

Senator SYMMS. I thank you for protecting our interests on that. We mentioned that that is why you were on the floor earlier, and we are glad you were successful.

Mr. Heldenfels, I mentioned earlier that a very valued member of our committee, Senator Bentsen, is from Houston, which is your hometown. He is unable to be here because of the tax bill conference, as I mentioned. He did, however, have some questions he wished to be asked. Senator Randolph has those now.

Senator RANDOLPH. Thank you very much, Mr. Chairman.

As an introduction to the two questions, I would want to have the record indicate that Senator Lloyd Bentsen has been particularly active in this committee over a long period of years in matters of transportation. He was the chairman of the Subcommittee on Transportation and did a very searching job and brought forth productive programs in the way of legislative matters, just as our present chairman is doing.

Mr. Heldenfels, is that the right pronunciation?

Mr. HELDENFELS. Yes, sir, Heldenfels.

Senator RANDOLPH. What background is that?

Mr. HELDENFELS. German.

Senator RANDOLPH. My wife was German, so everything is all right.

Mr. HELDENFELS. I am the second generation born in this country.

Senator RANDOLPH. You represent a very fine organization. What you say about the contractors who are failing, we know that to be true. These companies make a very constructive and continuing, public service not only to themselves as entities in the private industrial field but also to keeping America strong from the standpoint of our highway and bridge systems.

Numerous factors are a part of the increased cost in construction for highways. This is the question that Senator Bentsen is asking. Could you explain the impact that high interest rates have on construction contractors?

Mr. **Heldenfels**. Sir, at one time, interest rates weren't really a factor in the construction industry, but today, with the high interest rates, it is a major factor. In purchasing equipment now, sometimes the interest can actually cost more than the equipment. Generally I would say the majority of the equipment is purchased on a lease-purchase, and with three points above prime, floating prime, when you get the interest rates up to 18, 20 percent, you can see what a factor that would be. And it is really one of the reasons that some of the contractors are closing their doors.

Senator **Randolph**. This equipment is very high-priced, is it not?

Mr. **Heldenfels**. Yes, sir. A tractor nowadays would cost $250,000.

Senator **Randolph**. What type of tractor?

Mr. **Heldenfels**. Just a Caterpillar.

Senator **Randolph**. A Caterpillar tractor?

Mr. **Heldenfels**. Yes, sir.

Senator **Randolph**. It costs $250,000?

Mr. **Heldenfels**. Easily, yes, sir. Some cost more than that. That is the medium-sized tractor.

Senator **Randolph**. What would be the cost of it 10 years ago?

Mr. **Heldenfels**. Oh, I would say $70, $75,000.

The scrapers nowadays that 10 years ago cost $60,000 are now $300,000. You add interest rates to that, why, you have a pretty good price.

Senator **Randolph**. The following is another of Senator Bentsen's questions. If the increases to the program level are not considered as we look to reallocation of costs and user fee levels, what effects do you see on developing programs from continued deferment of capital investments for our highway system?

Mr. **Heldenfels**. The repairs that are needed today need to be done today. If you defer them 2 to 3 years from now, it will result in complete reconstruction, which would cost at least three times what it would today, which I think is a very conservative estimate.

Senator **Randolph**. Adding to the questions and your responses, I think that as members of the subcommittee, under the chairmanship of our present leader in this field, we must recognize that we cannot expect the States to produce the money with which to do this massive rehabilitation program. In the first 5, 10, 15 years, after the beginning of the program in 1957, the States could handle these matters.

But now, with these years passing, coming up to 25 years in which these roads have been in place, it is the wear and tear, is it not, to the point where I do not see that the States are capable of doing what we had in our highway legislation—the allocation of funds at certain percentages, the Interstate System at 90 cents out of a dollar, with the 10 cents being paid at the State level, and primary and secondary roads at differing percentages.

But I think it is impossible for States, without the aid of the highway trust fund, and with an increase in it, I don't see how this work can be done. What is your feeling?

Mr. HELDENFELS. I would have to agree with you, Senator. There is another cost besides the reconstruction cost, and that is the cost to the general public when you have to, say, detour around a bridge that has been put out. It has been estimated that to detour trucks around a bridge 10 miles, 400 trucks a day, it would cost upward of $730,000 a year. If you add 4,000 cars to that, it could run as much as $3,650,000 a year, just for the 10-mile detour. So that is a cost out of the general public's pocket, not just the repairs.

But the States do need funding. In other words, if you do turn it back to the States, you ought to turn back certainly some way for them to raise the money, such as the highway trust fund, or something, because they have no way of funding them.

Senator RANDOLPH. Thank you.

Senator SYMMS. Thank you very much, Senator.

Along that line of questioning, city planners in Houston estimate that the traffic congestion costs motorists $800 a year in time and gasoline wasted. Do you agree with that estimate?

Mr. HELDENFELS. I think it is very conservative.

Senator SYMMS. Recent studies have shown that the average American motorist will spend over $200 a year in tire and vehicle damage due to poorly maintained roads. Do you agree with that assessment?

Mr. HELDENFELS. I think it is more than that today. That study was made a couple years ago.

Senator SYMMS. You mentioned something about the tough times in the construction business. That is a concern to all of us. If we were able to find revenues to increase the appropriation for highway revenues, how quickly could the States and the construction industry mobilize to use the increased allocation efficiently?

Mr. HELDENFELS. My State could use it immediately. They have the contractors ready. They need work. The plans for the jobs are being delayed now. They are laying on the table, ready to be let.

Senator SYMMS. You mentioned in your testimony about the bids coming in 14 percent below the engineering estimates on the Federal highway projects. Do you attribute that largely to the downturn in the economy?

Mr. HELDENFELS. Yes, sir; and mainly competition. You take in Texas, we have gotten people out of the Midwest and the East coming down there. We still have a pretty good construction market there. We are having to bid below our costs to try to hold our crews together.

Senator SYMMS. Do you anticipate that that might change if the economy starts picking up, that we shouldn't anticipate we are going to continue to get construction work done below the engineer's estimates?

Mr. HELDENFELS. Well, of course, the engineers make their estimates according to the bid they are getting, so I don't know about the engineer's estimates. But I would say according to the workload, that the contractors get to where they could at least get to start making a profit, yes, I think it would change a little bit.

Senator SYMMS. Senator Stafford?

Senator STAFFORD. Thank you very much, Mr. Chairman.

My first question has to do with the inflationary rate in estimating the cost of future repairs to the Interstate System. What sort of an inflationary rate are you projecting?

Mr. HELDENFELS. About 9 percent.

Senator STAFFORD. Then if the administration's efforts to reduce inflation should bear fruit and we, for example, might maintain a 4- or 5-percent inflationary rate for this year and next year, would that not cut down on the cost of future construction on highways?

Mr. HELDENFELS. Yes, it would cut down, but it wouldn't cut down deterioration of the highways while waiting to repair them. That is where the big cost is.

Senator STAFFORD. Yes, I understand that.

It seems to me we have become so accustomed to high interest rates we are assuming in the future they are not going to improve very much. As a matter of fact, the public thinks they haven't, but at least for the moment there has been substantial improvement.

Do you believe that inadequate maintenance has contributed to the deterioration of roads and bridges; and, if so, what are the reasons for inadequate maintenance in your opinion?

Mr. HELDENFELS. Inadequate funding.

Senator STAFFORD. That is as brief an answer as you will get in the State I come from in northern New England. Maybe some of your ancestors came through Vermont on the way to Texas.

Do you believe the AASHTO interim guide for the design of pavement structures needs to be updated? Are the pavement thickness guidelines adequate in your judgment for current traffic volumes and weights?

Mr. HELDENFELS. Most of your highways now were designed for as low as 10 or 20 years. The designs we have today are much stronger and heavier designs than they were when the highway system first started.

But as the trucks and other vehicles increase their frequencies, well, you are going to naturally wear out roads. They weren't built to handle that much traffic. I believe the engineers know what they are doing.

Senator STAFFORD. Thank you.

Do you believe, in view of changes in the traffic and traffic weights in recent years on our highway systems, that we are doing enough in the way of research against the future uses and traffic loads on the highway system in this country to understand what we may be facing 5, 10, 15 years down the pike?

Mr. HELDENFELS. I think that you have to design for what you are going to have. Now, if your engineers underestimate what your traffic loads are going to be 10 years from today, then you would have trouble. I have heard it argued by very knowledgeable people as to the difference between the frequency of use and the weight, and I could be convinced by either one of them that one does as much damage as another. So I just don't know.

Senator STAFFORD. Thank you very much.

Thank you, Mr. Chairman.

Senator SYMMS. Thank you, Senator.

Senator Abdnor?

Senator Abdnor. Thank you, Mr. Chairman.

Mr. Heldenfels, I think you made a very appropriate statement here. I guess our road conditions are even worse than I had anticipated.

It almost shocked me, Mr. Chairman, when I heard him say that the 4 cents tax that we enacted into law in 1959 is only worth 1 cent. So I guess if we were trying to keep pace with what we were doing in 1960, we would have to have a 16-cent gas tax; is that right?

Mr. Heldenfels. Yes, sir.

Senator Abdnor. Tell me, when you say that 40 percent or half the primary system will reach the end of its design life during the nineties, if we take proper precaution and maintenance now, can some of that be extended beyond 1990, or do we just have to assume all of it has to be rebuilt?

Mr. Heldenfels. Yes, sir, it could be extended. When you strengthen a road by resurfacing, it strengthens it and gives you a longer life. That is where your savings come in, by doing it when it first starts deteriorating. If you can get in there and strengthen it, you increase its life.

Senator Abdnor. Is much of the highways too far gone for that? If we were to take proper steps to provide the kind of maintenance needed, could we still extend half of that highway Interstate System that we constructed in the early part? Can that be preserved?

Mr. Heldenfels. Well, the part that needs to be reconstructed now needs reconstructing. We could save the rest of it, yes, sir.

Senator Abdnor. It is something to be thinking about, because it would cost a lot more to start from scratch.

Thank you, Mr. Chairman.

Senator Symms. Thank you very much, Senator Abdnor.

Thank you very much for your very excellent contribution to our hearing record. We appreciate your testimony. We appreciate your association.

Panel No. 1 will be up next, and that will include Edward Kiley, American Trucking Associations, Inc.; and William Morgan, director of traffic, Frito-Lay, Inc., Dallas, Tex.

Mr. Kiley, why don't you please commence.

Gentlemen, your entire statements will be made a part of our record, if you care to abbreviate them.

STATEMENTS OF EDWARD KILEY, SENIOR VICE PRESIDENT, AMERICAN TRUCKING ASSOCIATIONS, INC., ACCOMPANIED BY JOHN REITH, DIRECTOR OF INTERSTATE COOPERATION; WILLIAM MORGAN, DIRECTOR OF TRAFFIC, FRITO-LAY, INC., DALLAS, TEX., REPRESENTING PRIVATE TRUCK COUNCIL OF AMERICA, ACCOMPANIED BY RICHARD HENDERSON, EXECUTIVE VICE PRESIDENT, PTCA; AND JOHN DEVIERNO, LAW FIRM OF BILLIG, SHER, & JONES

Mr. Kiley. Thank you very much, Mr. Chairman.

My name is Edward V. Kiley. I am senior vice president of the American Trucking Associations, Inc., with offices at 1616 P Street

NW., Washington, D.C. With me this morning is Mr. John Reith, director of interstate cooperation.

We have submitted for the record our complete statement which includes our specific highway tax recommendations to provide increased funding for the Federal-aid highway program and our detailed criticism of, and objections to, the methodology and recommendations contained in the "Final Report on the Federal Highway Cost Allocation Study," which the Secretary of Transportation submitted to Congress in May of this year. We would like to give a summary of our statement and ask the complete statement be made a part of the record.

Unless additional funding is made available for the Federal-aid highway program, particularly adequate funding to complete the Interstate System and to keep that system in proper condition, our country will face serious transportation problems.

This is also true if we fail to have adequate funding to move ahead with a program of modernization of the Federal-aid primary system and with adequate financial aid for other programs, including a bridge program.

If these needs are to be met, it means that there must be an increase in the Federal highway user taxes that support the highway trust fund.

The trucking industry has been, and is today, a major payer of taxes supporting the highway program. Under the present tax program, all trucks since 1956 have paid more than $45.8 billion in the highway trust fund. At the present tax rates, all trucks, representing 20 percent of all motor vehicles, are paying 50 percent of trust fund revenues. But more importantly, the larger trucks, trucks with gross weights above 26,000 pounds, are paying approximately 25 percent of trust fund revenues while constituting only 1.1 percent of total motor vehicles and traveling 5.5 percent of total mileage.

Our industry has given the problem of additional funding the most serious consideration. Increased highway taxes are increased costs of doing business. No business, particularly in today's economic climate, takes on increased costs of doing business too readily. However, we feel that the alternative of inadequate highway funding and, therefore, an inadequate highway program presents a far more serious situation for our industry.

In the past, the trucking industry's position on the Federal-aid tax program has generally been confined to a position of urging continuation of the highway trust fund, confining the trust fund taxes essentially to those currently in existence, and using the tax revenues for highway-related purposes. Together with these basic conditions we have repeatedly indicated our willingness to continue to pay our fair share of whatever additional funding is necessary for a sound, progressive highway program.

However, we feel the time has come to be specific. Everyone has talked of the need for additional funding, but few have said how specifically to make the tax changes needed to produce the revenue. We believe today such generalizations are inadequate.

Accordingly, the trucking industry has adopted as its official policy the changes in the Federal highway tax structure as set forth in our full submission. A listing of these changes is attached to this statement. It is the tax program listed as alternative No. 2 in the hearing notice. But as indicated in our main statement, our tax recommendations are tied to size and weight relief.

It is estimated that the additional revenues coming from these tax changes will mean that total highway trust fund revenues in fiscal year 1985 will amount to approximately $10 billion, or $2.73 billion more than would be collected at current tax rates.

Under the industry's tax recommendations, passenger cars will continue to pay the fuel tax, the lubricating oil tax, and the retread rubber tax; trucks will pay these taxes plus the additional taxes that trucks alone will pay, and almost all of these will be paid by the heavy trucks.

Under the present tax structure, combination vehicles would be paying $1.9 billion in 1985. Under the industry's program, those vehicles will be paying $600 million more, or $2.5 billion. This still represents an overpayment of the heavy truck's fair share of total highway taxes. This overpayment is supported by the industry's incremental study which was submitted for the record of the hearings May 7 before the Surface Transportation Subcommittee of the House Committee on Public Works and Transportation.

I would like to submit that same study for this record, Mr. Chairman.[1]

The overpayment is also supported by the incremental study submitted by the Secretary of Transportation in his "Final Report on Highway Cost Allocation," which was submitted to the Congress on May 14, 1982.

However, in submitting his report to the Congress, the Secretary of Transportation has ignored the findings of the engineeringly sound incremental study and instead adopted the Department's version of the "costs occasioned" study ordered by the Congress in 1978.

As part of our more detailed statement, we have submitted an historical review of the "costs occasioned" methodology, which shows that a true "costs occasioned" approach is the incremental approach. We believe, and are confident the record will support this belief, that Congress wanted a new incremental study.

Instead, we have a different methodology that is not a "costs occasioned" approach but is a new, untested method, resulting in recommendations for outrageous increases in heavy truck taxes that amount to confiscation.

To arrive at their tax recommendation, DOT used the equivalent axle load or highway damage concept. Those knowledgeable of the implications of the axle load approach knew from the beginning that such a methodology could not help but result in a finding that the heavy trucks were not paying enough in highway taxes. In short, once this method was adopted, the outcome was inevitable.

This new method is erroneously based on using the AASHO road test formula as the sole measure of determining highway life. The formula is acceptable when used for its true purpose, which is to determine highway design when related solely to anticipated vehicle axle weights. However, it is an incorrect application of the formula to determine highway life since it relates design only to weight and does not take into consideration the effect of age, weather, and the environment on pavement life.

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[1] Excerpts from the study referred to appears on p 113. The entire study has been retained in the committee files.

To use the formula to predict pavement life, and thus to allocate cost responsibility on this basis, inevitably results in a biased conclusion which charges the heavy vehicles with an inordinate share of highway cost responsibility.

Time and the elements take their toll on highways, and they do so regardless of highway design. Costs, therefore, due to these factors alone, are the responsibility of all vehicles on an equal basis. They are not the responsibility solely of the heavier vehicles, yet this is exactly what happens in the DOT highway cost allocation study.

Tax recommendations contained in alternatives No. 1 and 3 as shown on the hearing agenda are based on this fallacious approach to highway cost responsibility and, therefore, must be rejected in their entirety by the motor carrier industry.

The tax recommendations contained in alternative No. 2 are in line with the cost responsibility developed under the incremental method, both our incremental study and that made by the Secretary of Transportation. We therefore vigorously refute the statement that alternative No. 2 is not based on highway cost allocation findings. It certainly is.

The possible acceptance within the highway engineering fraternity of the biased cost allocation methodology used by DOT gives our industry serious cause for concern. We cannot believe that fair-minded highway engineers would endorse a methodology which gives so little credence to age, weather, and environment as the prime elements in highway deterioration. However, we are equally, if not more greatly, concerned with the possibility of the Congress accepting tax recommendations based on this fallacious approach.

The motor carrier industry has been the most consistent supporter of a sound highway program. No industry group has been more vigorous over the years in fighting for an adequate highway program, including additional taxes necessary to provide the funding.

Under these circumstances, we find it difficult to understand why those who should share our concern about a sound highway program seem so willing to advocate truck taxes that have no valid relationship to highway cost responsibility. This becomes particularly galling when these truck taxes, and the misguided theory that lies behind them, are so enthusiastically endorsed by the opponents of improved highways, the railroad industry.

In closing, I want to reiterate the industry's willingness to pay increased taxes to finance an adequately funded Federal-aid highway program. But this is on the basis of a sound engineering approach to the valid highway cost responsibility of the heavier vehicles. This means responsibility for those costs which can be directly attributable to heavier truck operations plus a pro rata share of those costs which exist independent of vehicle size and/or weight. These costs are properly assignable to all vehicles based on a common measure of use. This assignment of total costs is not what happens under the new methodology.

I would like to give you some figures, Mr. Chairman, to indicate what I am talking about here. The 1.1 percent that are heavy vehicles, the ones that are often associated with not carrying their fair share, operate 5.5 percent of the mileage. Now, if we would assume that there was no added highway cost because vehicles were different, they all were the same, then you could also assume that the heavy trucks were responsible for 5.5 percent of the tax collections.

All right. The heavy truck is paying $1.75 billion. These are 1979-80 figures, when trucks brought in their greatest amount of revenue. I hope we can get back to that $1.75 billion level again soon. If we were not responsible for any additional cost but our costs were measured by the common measure of vehicle miles, we would be paying $385 million. But we don't. We pay that plus $1.4 billion. That $1.4 billion is because we have a responsibility for additional cost. In other words, 78 percent of the truck tax payment is to discharge our obligation for added highway costs. We pay our fair share.

In conclusion, Mr. Chairman, to follow the Department of Transportation approach is to levy a punitive assessment on the Nation's most important form of freight transportation, which assessment has no valid relationship to true highway cost responsibility.

That concludes my summary, Mr. Chairman. Thank you very much.

Senator SYMMS. Thank you very much for a very clear statement. I don't think we have to put you down as undecided on that issue. Certainly you make a good case for your industry.

Senator Randolph?

Senator RANDOLPH. Thank you very much, Mr. Chairman.

I listened very carefully to every word you spoke. I do say once in a while how happy I am when I can hear someone. Not that I have difficulty hearing, but it is a pleasure to listen to you.

Senator SYMMS. Excuse me, Senator. We overlooked that we have Mr. Morgan, director of traffic for Frito-Lay, also at the table. Then we will have questions for both witnesses.

So Bill Morgan, please, give your statement. We both got so enthused about Mr. Kiley's statement that I forgot that there was anybody else at the witness table.

STATEMENT OF WILLIAM J. MORGAN

Mr. MORGAN. Thank you, Mr. Chairman.

My name is William J. Morgan. I am director of traffic for Frito-Lay in Dallas, Tex. I appear before you today on behalf of the Private Truck Council of America, which I serve as a member of the board of directors. With me today on my immediate right is Richard Henderson, executive vice president of the council, and John DeVierno, of the law firm of Billig, Sher, and Jones, our general counsel.

The Private Truck Council of America, Inc., is the only independent national organization representing nontransportation companies with respect to operation of trucks by those companies in the course of their own manufacturing and distribution, processing, or other businesses. By all estimates, private trucking is not only the largest segment of the trucking industry but also the fastest growing. PTCA's 1,800 member companies represent this Nation's Fortune 500 industries as well as numerous smaller operations.

The membership of the Private Truck Council, Mr. Chairman, would like to commend you and the members of the subcommittee for holding these hearings and for recognizing the need to resolve the complex issues of highway funding and taxation.

I would like for my full statement to be entered into the record, sir.

Senator SYMMS. Your full statement will be a part of our record.

Mr. MORGAN. Thank you. There are four significant points in my full statement which I would like to touch on.

First, some degree of highway revenue increase is necessary to fund the completion of the Interstate Highway System, to repair and rehabilitate both the interstate and primary highway systems, to repair and replace deficient bridges on both the interstate and primary highway systems, and we firmly believe that all such revenues collected should be dedicated to highway purposes.

Second, the increased user fees should be fair and not excessively tax one vehicle group disproportionate to another. As indicated in the DOT's supplementary letter to the House Public Works Committee—a copy of which is included as part of our full statement—the effects on highway of allowing larger trucks and heavier trucks in the States not yet allowing the 80,000 pounds, for instance, on the interstate system, are very minimal. Therefore, user fee increases should be spread across the entire spectrum of motor vehicles and size and weight relief does not justify tax increases on the trucking industry.

Discussion alternative 2 comes closest to meeting this criteria of spreading out highway increases while preserving the historic fee relationship among the various categories.

We would strongly oppose any weight-related fee for lightweight trucks as spelled out in discussion alternative 3. These type vehicles are used primarily in the cities and urban areas where the majority of the funds for streets and roads are funded locally by either ad valorem taxes or bond issues or whatever.

The third point I would like to make relates to productivity. Productivity in the United States has gradually been declining over the last decade or so. We view the highway funding issues as being directly related to highway productivity. To this end, we urgently need the size and weight relief embodied in Senate bill 1402, which cleared the Senate Commerce Committee last December, and the similar language contained in H.R. 6211 as reported in May. These reforms are vital to a healthy truck industry. As the DOT's supplementary letter to Representative Anderson points out, the benefits of reform are 35 to 1. In other words, for $35 billion in benefits to the public increased truck size and weight, it costs the public only $1 billion.

The fourth and final point concerns the highway trust fund balance. We feel that a long-range funding program should be enacted to allow the States the necessary lead time for planning, right-of-way acquisition, and a businesslike approach to handling the massive construction and reconstruction job ahead. Long-term commitments need to be made to avoid the start, stop, I don't know what is going to happen next, type of thing that we have had in the past.

This also would hold down unnecessary expenses throughout the system. A draw-down on the existing fund balance with language in any new bill to prevent building up a massive, uncommitted balance, would seem to assure a more effective use of our highway dollars.

Mr. Chairman, I want to thank you for this opportunity. I would be happy to try to answer any of your questions.

Senator **Symms**. Thank you very much.

Now, Senator Randolph, we will go back to where we left off with your questioning.

Senator **Randolph**. Thank you.

President Whitlock of ATA, as I recall, said in a recent speech that the cost allocation study was designed to show heavy trucks are not paying their fair share of highway maintenance costs. Is that your opinion, too?

Mr. **Kiley**. Yes, sir. And I will tell you why, Senator Randolph. We were disturbed about this approach when we had the first meeting with first the group that met with the Department of Transportation and the Congressional Budget Office, the policy group that was set up. We were so disturbed about it, as you will see in our full statement, we submitted a letter to you, sir, and to other members of the appropriate committees, back in 1980, expressing our concern.

The reason was simply this: It became obvious to us, despite our objections and our questioning it, that they were going to adopt as the prime method of measuring costs occasioned this equivalent axle load theory. Once they decided that this is what they were going to do, then the result was predetermined. The outcome was inevitable. There was no other way. You couldn't come up with any other answer once you used that method. We say once that method was adopted, then the outcome was inevitable. It was predetermined.

Senator **Randolph**. Are you saying, Mr. Kiley, that the cost allocation study then is biased?

Mr. **Kiley**. Absolutely.

Senator **Randolph**. Are you also wondering why the information from the AASHTO road test does not take into consideration the conditions of weather and the general environment?

Mr. **Kiley**. This is part of the problem, Senator Randolph. The AASHTO road test formula could not have taken it into consideration because the road test was conducted over a period of 2 years. It was purely a question of relative axle load and pavement thickness. It could not have measured weather, age or the environment. It did not last that long. It did not do that. It did not take those factors into consideration. All it took into consideration was the relationship between axle load and pavement thickness. It did not at all indicate what the ultimate effect of age would be. This is one of the problems we have.

We understand the need for increased funding which is out there. It is coming about primarily because this is an old system. The Congressional Budget Office report recognizes that, in the report the chairman referred to. These systems are 25 years old. That is the design life. It is showing the inevitable result of the age, weather and environment.

They are claiming that this theory they are using says in effect the highways would be OK today if your trucks didn't use them. That is ridiculous. Roads that don't carry trucks wear out within 20 years. Passenger car roads need resurfacing and repaving within the design life period. That is why we say this approach is false, biased. And once they said this is what we are going to do, it was predetermined what the result would be. All of our protestations were to no avail. We wrote to the Congress a year and a half to 2 years ago laying this out on the record. We were disturbed by what would happen if they applied this formula.

Senator RANDOLPH. What about motorcycles?

Mr. KILEY. Their effect on highways?

Senator RANDOLPH. Yes.

Mr. KILEY. I don't think their axle loads are that high that it would be measured that way.

Senator RANDOLPH. What about the noise element?

Mr. KILEY. I don't like it, but I don't criticize the motorcycle rider. I wouldn't get on one of the things. But if I could come back to one other point, Senator.

Senator RANDOLPH. I wasn't facetious about this. I am talking about the use of the roads.

Mr. KILEY. I don't think their use is that great. I think motorcycles, in terms of the impact on the surface, would be very light; in other words, using the equivalence of passenger car operation, which is basic road use, I don't think you could connect them. But even if you had a road out there that had passenger cars and motorcycles, given the air and heat, it will break up and need resurfacing.

Senator RANDOLPH. These questions are not just off to the side. I am talking about questions that are involved in highway usage. They are pertinent, whether it is used by the bicycle or the motorcycle or whatever the use, because they all are contributors to the highway which you are asking that it be built bigger and better. Isn't that right?

Mr. KILEY. Well, it is built that way. In other words——

Senator RANDOLPH. I mean to maintain it.

Mr. KILEY. That is right. That is why we are willing to pay our share of those taxes assigned to trucks based on the needs for the additional highway thickness or whatever you do to the road to accommodate trucks. That was designed in the 1956 highway program. We are paying taxes for the highway program under an adjustment Congress made in 1961, which was adjusted upward so that trucks would pay their fair share, which included their basic share of the common cost plus their added cost, which trucks alone bring into existence. We think that is what we are paying today.

Senator RANDOLPH. Mr. Kiley, you don't think you should pay more than your fair share.

Mr. KILEY. I don't think anyone should.

Senator RANDOLPH. Or anyone else speaking for the association.

Mr. KILEY. No, sir.

Senator RANDOLPH. That is not what we want or what we are working for.

What is the position of ATA with respect to the share of damages? I have read that you would support an increase in taxes on heavy trucks.

Mr. KILEY. Yes, sir.

Senator RANDOLPH. Which would have given the industry you represent a share from the present I believe 25.1 to 26.3 percent; is that correct?

Mr. KILEY. From 25 to 26.3 percent.

Senator RANDOLPH. 25.1 percent?

Mr. KILEY. Yes; to 26.3 percent. Yes, sir, that is right.

Senator RANDOLPH. Do you feel that is adequate?

Mr. KILEY. Yes, sir.

Senator RANDOLPH. That is your position here today and in the future?

Mr. KILEY. Yes, sir. I will tell you, we believe that that is an overpayment for the heavy vehicle as determined by our incremental study, and it also an overpayment as measured by the incremental study by the Department of Transportation. However, this is a tax program we are recommending, for the very simple reason that tied to this tax program is our request for size and weight relief that we so desperately need. We feel it would be completely unrealistic for us to come to the Congress and ask you to give us size and weight relief and propose a reduction in our taxes. That is why our program is set up as it is.

Senator SYMMS. On that point, could you explain your reasons for saying the DOT cost allocation method is in error?

Mr. KILEY. Because it used a false method of allocating highway cost. They are using the pavement damage concept, which says the only reason we build highways, the sole reason, is to accommodate axle loads. We don't build them to overcome the effects of age, weather and the environment.

This is not right. This is completely wrong. There is a certain basic cost out there whether building a new road or rebuilding a road which you have to incur, if you are going to withstand the weather, the age, and have it last a fair amount of time, say 20 to 25 years.

Over and above that, you provide something more because it is carrying trucks that are on the highways today. We have paid for that. We are paying for it today. And roads that are built just for passenger car traffic are not much thinner than the truck roads. But there is a difference. We admit that. We admit the roads would probably be more durable in a way if you did not have truck traffic. But we are paying for that in the highway program today. As I point out, if it weren't there, there would be no reason why we would pay this big differential of a billion and a half.

But we are not content with that. We know there is an added cost, but we don't think that added cost is properly measured by the methodology DOT used which wipes out these other factors and assumes, for example, if you applied their method, you took it for what it is worth, you would say that the interstate system, if you didn't have trucks, would last forever. You would never have to patch anything and resurface anything. That is just not right. No engineer could back that statement up.

Senator SYMMS. Thank you.

Senator RANDOLPH. Thank you, Mr. Chairman.

Senator SYMMS. Excuse me for interrupting you.

Senator RANDOLPH. I am happy with that interruption.

Proposals, Mr. Kiley, have been made for differentiation between gasoline and diesel fuel taxes. Now, I am not sure of ATA's position. Would you support such a proposal? How would it affect you, sir?

Mr. KILEY. No, sir. We believe there should be no differential between gasoline and diesel fuel. You would then be penalizing a very highly efficient vehicle. Diesels are very efficient and save fuel. It is a tremendous fuel saver.

If you were to put a differential on diesel, the first result would be to penalize the trucking industry in terms of its efficiency. You would greatly increase fuel consumption. This would cause some trucks to go back to gasoline, which would be the worst thing we could do.

The differential level would be a signal to the States to do the same thing. We would have diesel differentials popping up in every State. It would result in a very high, onerous tax burden which we don't think is justified.

We would oppose a diesel differential. Our tax program keeps the tax for gas and diesel increases to 6 cents, 7 cents in 1986, plus these other tax increases which apply only to the heavy trucks, and that will do the job.

Senator RANDOLPH. What proportion of trucks do use gasoline rather than diesel?

Mr. KILEY. Oh, the combination vehicles today use diesel. That is about 1 percent of all vehicles. Trucks are 20 percent, so diesels are about 5 percent of all trucks, from pickups to the heaviest trucks. Diesel is concentrated in the heavy truck area, which is about 1 percent of all vehicles.

Senator RANDOLPH. You wouldn't feel so unkindly toward the gasoline if it were a liquid fuel which had as its base coal, would you, rather than petroleum?

Mr. KILEY. No, sir, not if it could be used and gave us the same efficiency and same control over pollution as we have with diesel today.

Senator RANDOLPH. Thank you very much.

Senator SYMMS. Thank you very much, Senator Randolph. We appreciate your participation in this hearing.

I might have some further questions that we may wish to submit from some of the other Senators for the record by written correspondence, so we would advise the witnesses of that.

Mr. Kiley, you mentioned in the past, and I would like to have you comment on it here, what is your organization's position on the matter of western permits and their need and importance to the trucking industry and how that relates to this overall question on the cost allocation.

Mr. KILEY. One way it doesn't relate to it is the fact that the tax recommendations we are laying before the committee, which we support, would affect all truck operations. We mentioned we are tying that into size and weight changes in Federal statutes which will benefit all of the States. Without this size and weight relief, we have many truck operations, particularly in the West, that pay the taxes and get no realizable benefits.

We are now operating and have to operate under special permits for gross weights, for example, in the western part of the country, even though they are operating under the axle spacing formula in the current act, the so-called table B. They have to do this because they exceed 80,000 pounds, even though they do not exceed the formula boundaries. They now operate under special permits because the States have said they can issue such permits in some cases, but in many cases the DOT has said you can't do this under your grandfather rights. So what we need is relief so that States can take advantage of the longer combinations that now operate under a special permit.

That is an expensive and onerous burden under which to operate. We want relief so we can have special permits and allow these vehicles to operate with these permits, even though it is a divisible load, with two or three trailers together. We need that relief. We don't have that under the proposals currently before the Congress, but that is desperately needed. Without that kind of relief, then we have a problem of many motor carriers, mostly in the West, paying higher taxes and getting no relief in size and weight.

Senator SYMMS. Thank you very much.

Mr. Morgan, both DOT's recommended cost allocation approach and the incremental approach show the lighter trucks have been subsidizing heavier trucks. Do you, first off, agree with that? And if that is the case, do you believe there should be a redistribution of the tax responsibility between the truck classes, or should this differential continue?

Mr. MORGAN. I am not quite sure how to define lighter trucks. Do we start at the pickup truck level, which weighs about 4,000 pounds, or do we start with the 26,000 pounds? It is very difficult to differentiate.

As I said, most of the lighter trucks operate in the cities and urban areas and are not really on the interstate or primary-aid highway system. Therefore, I think that those types of trucks should be exempt from these special use tax fees, but not from any of the other fees.

Senator SYMMS. Would you agree with that, Mr. Kiley?

Mr. KILEY. The implemental study shows that both light and heavy trucks subsidize passenger vehicles. But I believe if you were to check, as we are doing now, and we have not completed our analysis of the cost allocation study, one reason for the alleged overpayment of the light truck under the consumption approach as compared to the heavy truck is they have some very, very queer figures in total vehicle registration numbers. We think they are very understated for light trucks both in numbers and mileage. If you do that, if you understate their mileage and overstate the heavy vehicle mileage, which I think they have done, you build in a bias in terms of the heavy to light truck. So we are not sure the findings are correct in light of their use.

Senator SYMMS. In view of my concern we are going to have votes on the floor, I am going to, with your permission, submit some questions so that we can have answers put back in to complete our hearing record.

I want to thank both of you for appearing before the subcommittee. You have made excellent statements.

I will now call up panel number two so we can at least get everyone on the record before we start voting on the floor. I call William H. Dempsey, Association of American Railroads, and Jerry Connors, American Automobile Association. Will you gentlemen please come forward.

Your entire statements, Mr. Dempsey and Mr. Connors, will be made a part of the record. If you wish to summarize, please do so. Go right ahead, Mr. Dempsey.

STATEMENTS OF WILLIAM H. DEMPSEY, PRESIDENT, ASSOCIATION OF AMERICAN RAILROADS, ACCOMPANIED BY LEE LANE; AND JERRY C. CONNORS, MANAGING DIRECTOR, GOVERNMENT AFFAIRS, AMERICAN AUTOMOBILE ASSOCIATION, ACCOMPANIED BY CHARLES BRADY

Mr. DEMPSEY. Thank you, Mr. Chairman.

I appreciate, of course, the opportunity to be here to state the views of the rail industry on these very important issues that you are addressing.

I begin with the unquestioned proposition that there is a large and urgent need for massive additional financing for the highway system. I don't think I need to elaborate on what has been said already on that. The committee is much more familiar than I am with the character and the urgency of that need. I am confident that the committee and the Congress will eventually, in one way or another, respond to that need.

Our concern is with the form that that congressional response will take. The cost allocation study makes quite clear that the form of that legislation will have a very important bearing upon the rationalization, or the nonrationalization, of the Nation's transportation policy.

As I am sure the committee would expect, I have a somewhat different viewpoint from Mr. Kiley on the cost allocation study and its methodology. We discussed it in detail in our statement. Again, I will rely on that statement.

It does indicate, as the committee and everyone in the room is aware, that heavy trucks radically underpay their cost responsibility. Specifically, the underpayment is, according to the cost allocation study, about 45 percent of that cost responsibility. This in turn has an important bearing on the underfinancing of the system. DOT estimates unless something is done by 1985, the heavy truck underpayment will run in the range of something like $2 billion a year.

It is relevant to note, I think in connection with what Mr. Kiley said, that the Federal study results generally correspond with those of almost all of the cost allocation studies that have been made recently, including those in a number of States. They are listed and identified in my full statement.

A word perhaps about methodology. I am not an expert. I think the committee would naturally pay much more attention to the engineering staff of FHWA, which is among the most respected experts in the world on this subject. But I think it is worthwhile noting that ATA misstates the case if what they intend to say is that FHWA took no account of such factors as environment or weather.

Just by way of illustration, I pick a single quote from chapter 1, page 8, of the Federal study report. It states: "Research conducted for the HCAS to synthesize knowledge and data base on pavement damage has shown that most pavement damage is an interactive phenomenon, the environment and axle loads working together." This conclusion was reached after FHWA spent several hundred thousand dollars researching the causes of pavement deterioration.

As even such a nonexpert as myself would expect, having taken account of all causes of deterioration, FHWA-DOT concluded that heavy trucks pay too little for the pavement deterioration they cause.

On the other side of it, I may say whereas ATA thinks the results are distorted against heavy trucks, we think that the opposite is true. Again I will rely upon our analysis in my statement.

The problem here, however, speaking in general, has to do with the methodology that DOT uses to assign so-called common costs, residual costs. DOT adopted a vehicle miles traveled approach, which is certainly one possibility. It is, however, by no means the only logical approach. One could take a benefit approach, and if one did that, then heavy truck cost responsibility would rise substantially. The residual costs are very large, as the committee knows. They represent some 47 percent of all Federal highway costs. And under the DOT approach, the heavy truck combinations of 70,000 pounds or heavier are assigned only about 6 percent of those residual costs. A different approach, a benefits approach, would increase total heavy truck cost responsibility by 25 percent.

Thus the rail industry also sees the study as biased. But as I say, we see a bias opposite to that claimed by ATA. Nevertheless, we do think the study represents a notable step forward in an accurate appraisal of the proper allocation of highway costs.

There are a number of reasons, of course, for eliminating this imbalance. One speaks in terms of equity among the users of the systems, preservation of the Nation's heavy investment in the highway system.

From our perspective, what we are concerned about is the distortion that this subsidy—and it is a subsidy, of course—causes in the transportation market. Because some 70 percent of rail freight revenues are derived from traffic that is highly truck competitive, the heavy truck subsidy has had a major distorting effect. The subsidy permits the motor carrier, the heavier trucks, to reduce their rates because the taxpayer is picking up part of their costs. This then results in a major diversion of traffic from rail to highway.

This has unquestionably damaged the railroad industry. Railroading is an industry that has chronically had anemic financial results. The Congress is only too familiar with the kinds of problems that this has caused for the shipping public. Indeed the Congress has had to work long and hard trying to restructure the northeastern railroads after the catastrophe of the Penn Central collapse and then the elimination of the Rock Island as an operating railroad and the truncation of the Milwaukee Road. There were many reasons for these rail industry problems, but I think unquestionably one of the most important problems had to be the major subsidy that has over the years been given to the railroads' competitors. The problem has been especially important in the Northeast where there is at this very moment an effort of Conrail to become a viable enterprise.

From the public's point of view the heavy truck subsidy means an overall increase in transportation costs. That happens because the subsidy shifts traffic from the truly low-cost carrier—in this case the railroads—to the lower priced mode—in this case the heavy motor carriers. Yet in many cases heavy trucks may remain the high cost carrier if one takes into account, as economically one must, the impact of the subsidy. Some carriers benefit, some shippers benefit, but overall the taxpayer and the general public are the losers.

The cost allocation study charts what we would consider a minimally acceptable solution, a graduated version of the Federal highway users tax. I say minimally because of what I have already said about the questionable aspects of that study, but also because it fails to take into account distance. It does take into account weight, and that is of course essential. But without accounting for distance, there will still be inequities among or within the different weight classes.

ATA's proposal, obviously, is not one that we would find satisfactory. It doesn't raise enough money in the first place, and it relies heavily on taxes that aren't directly related to use. Therefore, it simply doesn't correct the existing imbalance in the system.

As to the three alternatives proposed for discussion by the committee, I rely on my statement. In general, let me say that one closely tracks ATA's proposal. The other two represent only modest improvements over the present situation.

Thank you, Mr. Chairman.

Senator SYMMS. Thank you very much.

Mr. Connors, we will have to wait until I go to the floor and vote and return. I hope there is just one vote. If there is just one vote, I should be back in 10 minutes. So the committee will stand in recess until that time.

[Brief recess.]

Senator SYMMS. The committee went into recess just after Mr. Dempsey had testified. We now are looking forward to hearing from Jerry C. Connors, managing director, Government affairs, the American Automobile Association. I guess you are accompanied by Charles Brady; is that correct?

Mr. BRADY. Yes, sir.

STATEMENT OF JERRY C. CONNORS

Mr. CONNORS. The AAA, serving more than 22.5 million members, appreciates this opportunity to comment upon the important issues of highway program needs, user taxation and the allocation of highway costs among the various user classes.

The subcommittee has already received testimony from AAA and others to the effect that the highways and bridges of this Nation are deteriorating at an alarming rate. The interstate system is not yet completed, but many sections are already in need of major reconstruction. Every year, more sections reach or exceed the 20-year design life. We are also faced with the need to rebuild an aging primary system and must cope with a near crisis situation with respect to the almost one-half of all highway bridges in the Nation that are either deficient or obsolete.

Thus, the thrust of the highway program in the 1980's must be toward preserving and rehabilitating the huge investments made in the sixties and seventies. To provide the basis for the necessary revenues through an equitable tax mechanism, Congress enacted legislation in 1978 directing that a new highway cost allocation study be completed. The results of this 3-year study were reported to Congress in May.

AAA supports the methodology and findings of the highway cost allocation study. The methodology is somewhat different from that used in previous cost allocation studies in that the rate at which equivalent single axle loads [ESAL's] are accumulated by heavy trucks is taken into account in the determination of cost responsibility for repair and rehabilitation. This has been referred to as the consumption method in that the accumulation of ESAL's consume the ESAL reserves provided for in the pavement design. This consumption method is particularly relevant to the nature of the Federal-aid highway activity forecasted for this decade; namely, repair and rehabilitation.

The incremental method used in earlier studies has been a widely accepted method of computing the relative cost responsibilities of various classes of users in the construction of new facilities. It relies on the layered principle which holds that the cost of the basic road be shared equally by all vehicles in relation to their share of vehicle miles of travel or axle miles of travel. Succeeding increments of pavement required by heavier axle loadings are shared by all vehicles requiring the additional strength. While the incremental approach may have been an acceptable method for computing cost responsibility for new construction and, in fact, an updated version is used in the highway cost allocation study for new pavements, it is not satisfactory for consideration of repair or rehabilitation of older pavements because of the disproportionate share of ESAL's consumed by heavy trucks.

All States use the AASHTO design guide for pavement design or some adaptation of the principles incorporated in that guide. Prediction of equivalent single axle loads over a specific timeframe, usually 20 years, plays a very important role in determining the structural requirements of the pavement. Generally, the States have found a good correlation between the various formulas used in design and actual performance under traffic.

In many instances, however, the 20-year design life accumulation of ESAL's has taken place in less than 20 calendar years. For the most part, this can be attributed to the great increase in the number of heavy axle loads during the economic growth period of the sixties and seventies; the general increase in legal axle loadings which took place in that era through actions of the State and Federal legislatures; and a substantial increase in the frequency of even heavier loadings made possible through the issuance of special permits. All of these factors have had a significant effect on the requirement to repair and rehabilitate existing pavement.

The total accumulation of ESAL's used in determining the design life of a road can be the result of a great many vehicles with light axle loadings, fewer vehicles with heavy axle loads, or a combination of both. In a 1976 report, the State of California noted, "The California Transportation Laboratory has estimated that 99 percent of the damage done to structural pavement is caused by vehicles weighing over 6,000 pounds." In a January 1980 report, Tennessee DOT indicated that if trucks paid for highways on the basis of their 18,000 pound axle load equivalency factors, they would have to pay 96.8 percent of the cost. However, if trucks paid on the basis of their proportionate share of vehicle miles of travel or axle miles of travel, their share would be only 8.94 percent or 13.42 percent respectively. With such a dominant share of responsibility for using up or consuming the available ESAL components built into the roadway, it seems appropriate to us that taxing mechanisms devised to recover this cost responsibility should give heavy emphasis to the disproportionate share of ESAL's attributed to heavy axle loadings.

Any taxing mechanism directed at recovering highway costs through an equitable distribution of the tax burden among the classes of vehicles occasioning these costs must incorporate an appropriate mix of taxes. It must be recognized that light vehicles—those under 26,000 pounds—are responsible for about 95 percent of total vehicle miles of travel and 89 percent of Federal fuel taxes paid. Yet they are responsible for 10 percent or less of the ESAL's. Therefore, it would seem apparent that any mix of taxes relying heavily on fuel taxes or on VMT assignment would most likely assign a heavier tax burden on light vehicles than would be appropriate for their determined cost responsibility.

AAA generally supports the alternatives in the highway cost allocation study identified as 2A, 2B, and 2C. We believe that any of these alternatives will assign appropriate charges to all vehicles. However, as we note later, some adjustment in rates of various tax categories may be necessary.

We find serious problems with the committee staff alternative 2 furnished with the committee invitation to testify. This alternative provides a program level of only $9.4 billion for the next several years, with a level of $10.5 billion after 1985. We believe that the level should be about $12 billion initially, with upward adjustment after 1985. Perhaps the most serious deficiency with alternative 2 is that major reliance for increased income is placed on the fuel tax and minimum reliance on the heavy vehicle use tax. For example, an 80,000-pound truck would pay only $480 per year use tax under this alternative. Under committee staff alternative 1, that same vehicle would pay $1,760, and under alternative 3 an estimated $1,378 for the familiar 18-wheel tractor semitrailer.

Use tax for the 80,000-pound tractor-semi for a $12.7 billion Federal program level under HCAS alternative 2A would be $3,992; under 2B, $4,114; and 2C, $4,531. A comparison is shown in the following form:

80,000-pound gross vehicle weight tractor-semi at $12,700,000 program level use tax dollar per truck

Committee staff alternatives:	
1	$1,760
2	480
3	1,378
HCAS alternatives:	
2A	3,992
2B	4,114
2C	4,531

This comparison of the use taxes assessed against individual trucks in the HCAS alternatives leads us to the conclusion that perhaps too much reliance is placed on this tax. Therefore, we recommend that the rate be reduced in this category and that the additional amounts needed to produce equity be attained through a combination of a diesel fuel differential tax—with provision for rebate to light vehicle owners—and through an excise tax on truck sales for trucks over 33,000 pounds gross vehicle weight.

We recognize that a major justification for a motor fuel tax as a highway user tax is that it provides a good measurement of the extent of highway use. However, diesel-powered vehicles are capable of substantially greater miles-per-gallon ratios than gasoline-powered vehicles in the same general weight class and having similar operational characteristics. We believe a diesel fuel differential tax is an appropriate way to insure that fuel tax payments of diesel-powered vehicles more nearly approximate the highway cost responsibility of such vehicles.

Exact rates of these adjustments would be determined after the truck use tax is decided upon. We would suggest that the use tax be scaled upward by 5,000-pound increments from 26,000 pounds to 120,000 pounds gross vehicle weight, with the rate set at about $25 per thousand at the 80,000 to 85,000 pound level.

We see merit in the proposal for a variable rate on single and tandem axles as contained in committee alternative 3, but since most States register vehicles on a gross weight basis, we question if the proposal is administratively possible. If it can be accomplished, we would favor that method, with the suggestion that the weight table be carried up to 24,000 pounds single and 40,000 pounds tandem.

If a fee structure for heavy trucks could be adjusted to provide tax incentives for lower axle loadings, such an arrangement could encourage spreading the load over more axles, thereby extending the life of our existing highway facilities.

Whether the use tax is levied on a gross weight basis or an axle weight basis, it would seem practical to have the fee collected at the State level, at time of registration. States could then be reimbursed for the administrative costs of the transaction.

AAA has generally supported the initiative of Transportation Secretary Drew Lewis in calling for an increase in highway user taxes. A copy of our letter of March 25, 1982 to Secretary Lewis on this subject is attached. Several key caveats are included with our support of the concept of increased user revenues. We oppose any diversion of the increased revenues to transit and we believe any increases should be accompanied by a drawdown of the existing balances in the trust fund, along with the assignment of user fees in accordance with cost allocation study findings.

We reiterate our previous recommendation to this subcommittee that the highway trust fund be extended to the year 2000 and that it be permitted to operate as it was designed to under terms of the Byrd amendment, unfettered by obligational ceilings or other controls which result in the creation of large balances.

Thank you.

[An attachment to Mr. Connors' statement follows:]

AAA AMERICAN AUTOMOBILE ASSOCIATION
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JAMES B CREAL
President

The Honorable Drew Lewis
Secretary
U.S. Department of Transportation
400 Seventh Street, S.W.
Washington, D.C. 20590

March 25, 1982

Dear Mr. Secretary:

Recently it has come to our attention that there may be some confusion regarding the position of the American Automobile Association on the need for increased highway user fees. Because we have always recognized the importance of good roads and have consistently lobbied for adequate financing for the construction and preservation of these roads, we feel it is vital at this time to restate our position. This should avoid any further confusion as the Congress examines various proposals.

From the standpoint of the structure of the highway program, AAA believes that federal involvement should be concentrated on roads of the highest national significance, that is, the Interstate and Primary systems and the bridges on those systems. Control of Secondary and Urban systems should be gradually returned to the states.

With regard to financing, we recognize the need for additional revenues and, therefore, would support measures that would increase existing user fees to the extent necessary to carry out the federal highway program. These measures should be accompanied by a drawdown of existing Trust Fund balances and assignment of user fees in accordance with the recently completed cost allocation study.

We do oppose the diversion of any funds from the Highway Trust Fund to public transportation. We believe that such a move would compromise the basic "user fee" concept that the Reagan administration has endorsed.

We do not withhold support of that part of your proposal lightly. We recognize the need for adequate public transportation facilities, particularly in urban areas. However, we strongly believe that revenues for public transportation should come not from highway users but from the general fund or from existing provisions of law such as the Urban system program. I think it is important to consider that, to the best of our knowledge, all those groups that pay into the Highway Trust Fund continue to be opposed to diversion.

Mr. Secretary, we are fully appreciative of the fact that the Highway Trust Fund has provided this country with the finest highway system in the world and we remain committed to its preservation. We look forward to continuing a productive dialogue on this issue as it works its way through Congress.

Sincerely,

Jim Creal

Senator **Symms**. Thank you very much.

Mr. Dempsey, the highway cost allocation study says that consideration should be given to exempting piggyback trailers from the new truck excise tax. How big an impact would that have, and how much money are we talking about, and what would be the effect if the tax were eliminated?

Mr. **Dempsey**. Do you know, Lee?

Mr. **Lane**. No.

Mr. **Dempsey**. I am sorry. I am just going to have to supply that to you in writing, Mr. Chairman.

[The information requested may be found in response No. 5 of the Association of American Railroads' responses to additional questions, p. 261.]

Senator **Symms**. I would be interested in that. You mentioned the inequity as far as the Penn Central was concerned and it was one of the contributing factors. But I was wondering if they were eliminated on the piggybacks, what your opinion would be, if it would be inequitable the other way then for the piggybacks that are used on roads.

Mr. **Dempsey**. Yes. Let me get back to you on that and reflect on that and we will supply you with a written answer.

Senator **Symms**. I would imagine that you probably would agree with me that work rules that were built into the years and years of union contracts probably had more to do with the demise of Penn Central than the competition from the trucks, though, wouldn't you?

Mr. **Dempsey**. No, I wouldn't agree with that.

Senator **Symms**. You wouldn't agree with that?

Mr. **Dempsey**. No, sir.

Senator **Symms**. Even though sometimes they are paying people double?

Mr. **Dempsey**. Excuse me?

Senator **Symms**. I understand they had work rules on the Penn Central that they could run 120 miles and that counted as 2 days, and they could do that in 1 day, or they would only have to work 20 hours and get paid for 40 hours.

Mr. **Dempsey**. I used to be the chief negotiator of the rail industry, and I am not about to defend the work rules of the rail industry. What you are referring to is the 100-mile day. This rule dates from the early part of the century. I can give you, if you want, the engineers' defense for it, but that is right now under consideration of the Presidential Emergency Board.

I would say this about the situation, though. I think that while we have onerous work rules, other industries do, too. The fact of the matter is that over the last 10 years, we have made major progress. We solved the fireman-management dispute, which was the longest standing dispute in history when it was settled. We have made major progress.

I would agree work rules were a significant factor in the Rock Island and Milwaukee and the other northeastern roads, and Penn Central. Yet there is also a strong relationship between the growth in long-haul trucking and declining rail market share. Truck market share has risen as that of rail has fallen, especially in manufactures. I think that tells the story.

Senator SYMMS. Thank you both very much. I would like to ask you both some more questions, but we will submit them in writing. We have another vote now on the floor. If Dr. Nancy Morgan and Peter Lafen could please come forward, we will get them started.

We have Dr. Morgan, Peter Lafen, and Charles J. Calvin of the Truck Trailer Manufacturer's Association left. We will take panel 3 right now, Dr. Morgan and Mr. Lafen.

Dr. Morgan, please go ahead.

Ms. MORGAN. Thank you, Mr. Chairman.

Senator SYMMS. If you can do your statement within 5 minutes, we would appreciate it.

Ms. MORGAN. Fine. We will do that.

STATEMENTS OF NANCY MORGAN, WRITER-RESEARCHER, CENTER FOR AUTO SAFETY, ACCOMPANIED BY GERALD DONALDSON; AND PETER LAFEN, TRANSPORTATION COUNSEL, FRIENDS OF THE EARTH

Ms. MORGAN. My name is Nancy Ellen Morgan. I am a writer/researcher at the Center for Auto Safety in the highway safety area. I am accompanied by my colleague, Dr. Gerald Donaldson, who is an expert on highway policy.

Mr. Chairman, we appreciate this opportunity to testify before you today on issues regarding highway safety and user fees. We certainly share the concern of Congress that our Nation's roads should be in nothing less than first-rate condition.

Some years ago Members of an earlier Congress met in a similar series of hearings and acknowledged the fact that our Nation's roads were in terrible condition. As noted in their committee report, they passed legislation to encourage the development of a general system of improved highways. This was the 64th Congress of 1916, and the legislation was known as the Good Roads legislation. This, and the subsequent Federal-Aid Highways Act of 1921, laid the groundwork for the Federal-aid highway systems, whereby a network of roads was developed with the intention of expediting national commerce and promoting national defense capability.

As our Federal-aid system approaches its 70th birthday, the gap is widening between the worsening condition of our roads and bridges and the amount of money available to fix them. Due to financial constraints, States are turning to quick remedies to keep their roads operational at the expense of safety to motorists and long-term preservation of the system. Ultimately we may be, as we have heard too often, pennywise and poundfoolish. In our attempts to save money, we continue to smooth pavement surfaces for the short term while neglecting to treat the underlying structural problems and correct persistent safety design deficiencies. In the meantime, roads and bridges continue to deteriorate at an accelerating rate, while motorists daily risk their lives and waste fuel on poorly maintained and hazardous facilities.

Senator Symms, do you want to go vote?

Senator SYMMS. I have to go vote. We will try to take a very brief recess and I will return as soon as I can. Thank you.

[Brief recess.]

Senator SYMMS. Doctor, please go right ahead.

Ms. Morgan. Should I start where I left off?

Senator Symms. Yes, that would be fine.

Ms. Morgan. Mr. Chairman, the pervasive problem of poorly maintained roads and bridges is serious now but may be even more disastrous in the near future as continued deterioration raises the potential for fatalities, injuries, and property losses. This is particularly crucial on the older, noninterstate Federal-aid systems which were not built to carry increased traffic and heavier loads.

The amount of revenue presently received by the trust fund is completely inadequate for our current highway needs. Federal user fees have not been increased in 23 years. In a period of additional budget cutbacks, the burden of responsibility in providing adequate highway revenues must necessarily fall upon its users. If user fees do not keep pace with increased demand for better safety and service on our roads, users may one day face the prospect of having to accept a permanently deficient surface transportation system.

Mr. Chairman, in view of the critical necessity to improve our Federal-aid highway system, which is not possible without increased financial relief, the Center for Auto Safety supports a significant increase in user fees. This, we believe, is essential if we are to keep pace with the rising cost of adequate highway repairs. We support an increase in fuel and other excise taxes, believing that those who use the roads should pay for their construction and repairs.

Time is of the essence, and we are hopeful, Mr. Chairman, in view of your interest in maintaining a safer first-rate national system of public roads, that you will work to find a comprehensive solution to this problem. We appreciate the opportunity to share our views with you today and would be pleased to answer any questions. I am especially pleased to be here because I used to work up here. We would be happy to answer any questions.

Senator Symms. Thank you very much, Doctor. We appreciate your testimony.

Mr. Peter Lafen.

STATEMENT OF PETER LAFEN

Mr. Lafen. Thank you, Senator. I would like to thank you and the committee for inviting me here. I am going to be presenting testimony on behalf of several groups, and it is testimony that has been prepared by Harriet Holtzman-Parcells of the Environmental Policy Center. I will be speaking on behalf of EPC; the Central States Resource Center; my own organization, Friends of the Earth; the National Association of Railroad Passengers; and the National Wildlife Federation—all of which groups have endorsed the material that has been submitted to the committee.

Senator Symms. Your entire statement will be made a part of our record. I hope you can summarize it because we do have one more witness and we have another vote on the floor coming up very shortly.

Mr. Lafen. I certainly will do that, Senator.

I think the first fact that becomes evident from the hearings today and that we make the point in our testimony is that there is no disagreement about the deterioration of American roadways, whether they be interstate or other Federal-aid highway system roads.

We in the environmental community have spent many hours, many individuals have spent almost entire careers, fighting particular highway projects and particular links in the Interstate System. But I think with the same vigor that we oppose those segments, we endorse the adequate maintenance and repair of the system that has been constructed over time.

There are very obvious reasons for that. The energy efficiency that is lost, the economic losses through damage from unrepaired roads, are all sufficient to get our support for a program that would adequately maintain the Nation's highways.

We agree generally with the highway cost-allocation study, that the finding that use is a critical factor has to be addressed in this stage of the highway question. The former allocation methods using the incremental approach may have been appropriate for the construction phase, but now that we are looking at maintaining an essentially mature system, we go along with and support the AASHTO road test figures and the use that has been made of those figures by the Department of Transportation and, I would note, as noted in our testimony, by a number of States throughout the country that have conducted their own independent highway cost-allocation studies. They have also found significant underpayment on the part of the heavy truck industry and have recommended that increases in user fees be adopted using a variety of methods but that basically would fall under the characteristics, as the committee has suggested, of following the recommendations of the cost-allocation study.

We believe that this increase in highway costs or highway fees paid by the heavy truck industry needs to occur rather quickly. The material that we have submitted indicates, based upon the reports of the highway cost-allocation study, that this will not be an overwhelmingly significant increase to the truck industry based upon their overall operating costs. It is a relatively small percentage, we think, that is very well indicated by the studies that have taken place here, done by consultants throughout the country, and we endorse those.

One thing we would like to add is that we are concerned about the entire system, not just the maintenance of the Interstate System. One particular addition that we would like to make, whether it be in the long run or in immediate construction projects, is that access for the other users of the highways, that Senator Randolph mentioned—bicycles and pedestrian access—that in some cases has been limited by the interstate program, also be included as a part of the continuing repair and reconstruction.

I am not prepared today to recommend a particular level of highway needs. We are in the process of reviewing that. But I would say for Friends of the Earth that our recommendation would be somewhere close to what the CBO recommended as the minimal system for completion of essential national needs in the Interstate Highway System and that that be the level, with the addition of safety features and access for groups that have previously been shut out or restricted from the use of the system; namely, bicycles and pedestrians.

Thank you.

Senator **Symms**. Thank you very much.

Dr. Morgan, how much would you recommend increasing the users fee from where it now is for the Federal highway trust fund?

Ms. **Morgan**. Did you want to address that?

Mr. **Donaldson**. Sure.

We think a minimum figure, Senator, would be at least a doubling of the present user fees. Secretary Lewis 'initiative earlier in the year we more or less support as being the minimum threshold that would be required. We have mixed feelings about the 1-cent dedication for transit. We haven't resolved those mixed feelings.

In terms of the 4 cents dedicated to highways, we would consider that to be a minimum figure necessary.

Senator **Symms**. But you would say in round figures approximately doubling the revenue of the trust fund?

Mr. **Donaldson**. Yes. We need authorization figures somewhere in the $15 to $16 billion range instead of the present $8 billion mark.

Senator **Symms**. Would you agree with that, Mr. Lafen?

Mr. **Lafen**. Yes, I believe we would. I think that the strict answer I would want to give on behalf of all the groups is that our answer as to the revenue needs depends upon the program authorizations that are going to go. They are inextricably linked. So it would be very difficult for me to say on behalf of the other groups precisely what level of revenue would be necessary, although we are basically concerned with meeting the maintenance needs and with adding those safety and access needs that are required.

Senator **Symms**. Thank you very much. As I said, we will submit your entire statements in the record. There may be some questions the committee will submit to you in writing for the hearing record.

Mr. **Lafen**. Excuse me, Senator. There is one point, in my attempt to summarize, I just remembered I completely forgot.

Senator **Symms**. Please continue.

Mr. **Lafen**. There is one part of the cost allocation study that is noted in our testimony we delivered that I want to emphasize.

I believe it is not only possible but highly advisable for the Federal Government to enter into some kind of a working relationship with the States to develop a weight/distance tax system that can either take advantage of the existing tax bureaucracies that are present in virtually every State or can actually develop some sort of a savings for those States. But I think that the study was perhaps deficient in not spending enough time in looking at how the 50 existing tax structures could be harmonized in a way that would not only save money at the local level but actually result in, one, a more effective and efficient way of allocating highway taxes among the heavy users; and, two—and this may be a real sleeper that we are starting to recognize perhaps—but a national weight/distance tax reporting system could result in perhaps some significant benefits in the enforcement of weight regulations. After all, if you are going to assess the heavy vehicles an additional tax, you sort of lose a lot of the benefit if a significant number of the vehicles are in fact carrying weights in excess of what they are paying under the system. So I think that that addition to the highway cost allocation study is one we would all want to recommend. Thank you very much.

Senator SYMMS. Thank you very much.

We will now hear from Charles J. Calvin, president of the Truck Trailer Manufacturers Association.

STATEMENT OF CHARLES J. CALVIN, PRESIDENT, TRUCK TRAILER MANUFACTURERS ASSOCIATION, ACCOMPANIED BY DAN MILLER, GOVERNMENT RELATIONS COUNSEL

Mr. CALVIN. Thank you, Senator. My name is Charles J. Calvin. I am president of the Truck Trailer Manufacturers Association, which represents builders of commercial truck trailers, tank trailers, and cargo containers throughout the United States. On my right is Dan Miller, our government relations counsel.

Our industry is one of the most depressed in the country. We are in the middle of our third consecutive year of low production. In 1981, at this time, we were down 52 percent compared to 1979. Through the first 6 months of this year, production is down yet another 21.4 percent from last year's serious decline.

The 10-percent manufacturer's excise tax on truck trailers and the 8-percent tax on related parts and accessories have been the worst ongoing difficulties of our industry for 30 years. They are an administrative nightmare that in time and effort cost a dollar to collect a dollar. Further, we doubt that there are a dozen bona fide tax experts in this field in government and private industry combined.

The main difficulty is that the excise tax law governing truck trailer manufacturers is based on a wholesale distribution organization. That portion amounts to only 4.52 percent of the industry and only 0.39 percent of that consists of owned or controlled wholesale distributors.

The two volumes you see before me represent 12 pounds of a looseleaf tax guide which we have prepared for our industry in an attempt to make the thousands of rulings, interpretations, et cetera, more apparent and perhaps more understandable.

TTMA has long supported full repeal of this burdensome, inequitable tax. As indicated by the attached chart, the collection of excise taxes on truck trailers averaged approximately $44 million annually for the period 1956–76. The 1956–81 period averaged about $68 million, some of which, of course, was due to the last several years of high inflation.

It is obvious that the revenue generated by truck trailer taxes is minuscule when compared to the fuel tax—a revenue source far simpler to enforce and collect. The fuel tax is also very directly use related.

We submit that the Congress should eliminate all the variable factors involved in the various taxes by repealing the excise taxes covering motor vehicles, parts and accessories, oil, tires, tread rubber, innertubes, and the highway use tax.

To replace the subsequent lost revenue, increase the fuel tax to 15 cents per gallon.

This may be too simple a proposal, but it would eliminate costly administrative problems and provide the necessary funds to carry out the highway program. At the same time, it would rectify a serious error which allowed the price of fuel to rise from approximately 37 cents per gallon to more than $1.20 per gallon without providing more than the original 4 cents per gallon to the highway trust fund.

Thank you.

[An attachment to Mr. Calvin's statement follows:]

TRUCK TRAILER MANUFACTURERS ASSOCIATION

Annual Shipments of Taxable Truck Trailer Units, Value and Estimated Federal Excise Tax

Year	Taxable # Units	Value	Estimated Tax
1956	67,824	$ 329,230,000	$ 24,692,250
1957	62,313	316,308,000	23,723,100
1958	51,751	280,588,000	21,044,100
1959	71,594	386,477,000	28,985,775
1960	61,842	334,767,000	25,107,525
1961	54,192	298,623,000	22,396,725
1962	72,976	403,557,000	30,266,775
1963	77,585	420,046,000	31,503,450
1964	90,000	460,912,000	34,568,400
1965	109,945	555,101,000	41,632,575
1966	120,239	623,726,000	46,779,450
1967	107,031	538,251,000	40,368,825
1968	125,812	607,293,000	45,546,975
1969	151,304	748,795,000	56,159,625
1970	119,967	611,982,000	45,898,650
1971	113,559	610,263,000	45,769,725
1972	165,674	854,351,000	64,076,325
1973	179,991	989,851,000	74,238,825
1974	226,769	1,379,861,000	103,489,575
1975	82,444	748,501,000	56,137,575
1976	112,370	1,051,545,000	78,865,875
1977	186,515	1,625,938,000	121,945,350
1978	230,529	2,199,548,000	164,966,100
1979	232,222	2,592,270,000	233,304,300
1980	152,753	1,899,854,000	170,986,860
1981	129,066	1,640,119,000	147,610,710
1956-1976	Average		$ 44,835,814
1956-1981	Average		$ 68,464,055

TTMA/8/82

Senator SYMMS. Thank you very much for a very direct statement.

Mr. Calvin, you heard some of the witnesses before you, particularly the gentleman that just preceded you, who had the allocation and supported a higher charge on trucks. You are saying 15 cents a gallon on fuel, and you consider the truck burns more fuel than the car and it would work out fairly. Is that correct?

Mr. CALVIN. Yes.

Senator SYMMS. How do you answer the question that on the Baltimore-Washington Parkway and the GW Parkway there is no truck traffic and yet those roads seem to get potholes in them, too?

Mr. CALVIN. About 25 or 30 years ago I was also interested in the southern Maryland road test. I was interested in watching a road test down here at Mount Vernon Boulevard. There wasn't any truck traffic on the Mount Vernon Boulevard either. Yet that broke up just as badly as any of the other roads. So I think that the factor of weather is much more prevalent in the breakdown of highways than almost anything else.

Senator SYMMS. In your statement you talked about collecting excise taxes on truck trailers and related parts and accessories as an administrative nightmare. Do you have any other suggestion of how these could be collected or how it could be improved in the administration of those taxes other than just outright repeal?

Mr. CALVIN. Here is our excise tax guide. Most people view the 10-percent excise tax as a simple number that you hang on a wall and add it to an amount and figure out what that percentage is and that is the excise tax. That isn't true, because there are literally thousands of interpretations and regulations. This doesn't represent at least 4,000 interpretations that IRS has that they haven't even published. It is so complicated that I still say there aren't 12 bona fide experts in the whole country who really understand the subject.

Senator SYMMS. What would be the administrative problems if you taxed tires over 100 pounds more than you taxed tires that weigh under 100 pounds?

Mr. CALVIN. For our purposes, as a trailer manufacturer, none, because we pay the tire tax to the rubber manufacturer.

Senator SYMMS. How about from the user's standpoint?

Mr. CALVIN. From the user's standpoint, they obviously would get a higher bill.

Senator SYMMS. Would they start trying to buy tires that weigh 99.5 pounds?

Mr. CALVIN. Some of them would, yes, sir.

Senator SYMMS. And maybe even possibly jeopardize safety. That wouldn't be very profitable, maybe.

Mr. CALVIN. It certainly wouldn't be very smart.

Senator SYMMS. Thank you very much. We will keep the hearing record open for any further testimony. There will probably be some more questions we may submit to you.

I appreciate all the witnesses who testified and helped to make this, the first of our hearings, a success in establishing the problem as well as the need that we face as a nation—to come up with some kind of a fair, equitable system, to make a commitment to the infrastructure of the highway system in this country. I think that is what most of the committee would like to see become a reality. So thank you very much. We stand in adjournment.

[Whereupon, at 4:35 p.m., the subcommittee was recessed, to reconvene subject to the call of the Chair.]

[Statements supplied for the record and responses to additional questions follow:]

STATE OF MICHIGAN
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RODGER D. YOUNG
WILLIAM C. MARSHALL

August 2, 1982

Honorable Steven D. Symms
United States Senate
452 Russell Senate Office Building
Washington, D. C. 20510

Dear Senator Symms:

I have been advised by the American Association of State Highway and Transportation Officials that the Senate Transportation Subcommittee may hold hearings on August 10th and 11th, to discuss the deterioration of the nation's highways.

The attached statement summarizes Michigan's position and I respectfully request that it be included as a part of the testimony at the hearings.

Sincerely,

John P. Woodford
Director

The State of Michigan is experiencing a severe decline in transportation revenue.

For 1982, the total dollars in Michigan's State Trunkline Fund are projected to be less than in 1975, while the construction cost index in Michigan has risen 43.3% and the cost to maintain state highways is up 117% from what it was in 1975.

In order to cope with decreasing revenue and to allow us to take advantage of the available Federal Aid, the Department has reduced its non-maintenance work force considerably. It has, for all practical purposes, eliminated the 100% State funded construction programs which, only a few years ago, were at the $50 million per year level and has opted for improvement alternatives which will require attention in a few years rather than desirable long-term improvements. Why? We simply have no money to spare and the funds must be placed where absolutely necessary. A good example of this is the work done on US-23, south of Flint, a four-lane freeway built in the mid 1950's that has reached its design life. The recommended solution was either to recycle the existing concrete pavement or remove and replace it. This would have cost approximately $1.5 million per mile. However, we only had funds for a thin bituminous resurfacing of the freeway. This is a temporary three to five year solution in lieu of the more permanent solution, which would have rendered US-23 relatively maintenance free for another 25-30 years. Poor economics? We simply had no choice.

We have also reduced our highway maintenance to the lowest levels in years and are looking at ways to further reduce it, such as less frequent roadside mowing, the closing of some roadside parks, postponement of non-essential repairs, etc.

Our highway needs, however, continue to mount. The bulk of our freeway network has reached a point where substantial improvement is needed in order to preserve the system, ironically at a time when our revenues are at their lowest point in many years. Our other highway systems are also deteriorating at a fast pace and unless relief is found, the cost to this state and local units of Government (Cities and County Road Commissions) is going to be unmeasureable in many areas. Our economy will suffer, the public will suffer, and the damage to our highway system may be too expensive to reconstruct within the forseeable future.

The Michigan Department of Transportation urges the U. S. Congress to provide additional Federal Aid Highway Funds to halt the deterioration of our highways, with more equitable distribution formulas, reduced federal controls and a reduced matching share to enable us to take advantage of the increased funds. To delay the needed action will only postpone the problem and increase the costs to improve the nation's highway network.

MICHIGAN DEPARTMENT OF TRANSPORTATION

August 2, 1982

Testimony of

H. C. Heldenfels

For

The Associated General Contractors of America

Before the

Subcommittee on Transportation
of the
Senate Committee on Environment and Public Works

August 10, 1982

On the Issue of

Current Highway Needs versus Existing Highway Revenues

AGC is:

- More than 30,000 firms including 8,500 of America's leading general contracting firms responsible for the employment of 3,500,000-plus employees;
- 113 chapters nationwide:
- More than 80% of America's contract construction of commercial buildings, highways, industrial and municipal-utility facilities;
- Approximately 50% of the contract construction by American firms in more than 100 countries abroad.

Mr. Chairman and members of the Subcommittee.

I'm H. C. Heldenfels, a general construction contractor from Corpus Christi, Texas, appearing before you today in my capacity as President of the Associated General Contractors of America (AGC), which represents more than 30,000 firms, including 8,500 of America's leading general contracting companies, responsible for the employment of more than 3,500,000 employees. These member contractors perform more than 80 percent of America's contract construction of commercial buildings, highways, industrial and municipal-utility facilities.

Construction is the largest industry in the nation. The economic fortunes of the nation and the construction industry depend totally on the condition of each other. Unfortunately, today, not only is the economy of the United States sluggish, but construction's share of the gross national product has declined from an historic 10 percent to 7.8 percent in 1981.

High interest rates and the current recessionary climate are taking their toll on the construction industry. As significant as these problems are to our industry, our greatest fear lies in yet another area -- the current federal policy of "no growth" capital investment in our nation's infrastructure, particularly its system of highways and bridges.

It is a frightening, but unavoidable fact that America's public facilities, particularly its highways, are wearing out faster than they are being repaired or replaced. Extensive hearings before the Congress have established, for example, that:

- Almost half the Interstate system will need major repairs by 1995 and other highway systems are in even worse shape.
- More than half the Primary system will reach the end of its design life during the 1980's.
- Almost 40 percent of this nation's bridges were built before 1940, and 45 percent of our bridges are already judged deficient.
- Eight thousand miles of the 42,500 mile Interstate System and 13 percent of its bridges are now beyond their engineered life and must be rebuilt. Two thousand miles of this system are deteriorating each year, requiring reconstruction.

The National Transportation Policy Study Commission in 1979 estimated that highway capital needs will total $900 billion in 1975 dollars through the year 2000, while revenues of $753 billion will be generated by all levels of government under existing policies. If spending is in fact constrained to the Commission's projected level of highway revenues from all sources under status quo policies, little if any funds for new construction or resurfacing will be available in the late 1990's. Almost all available funds will be required for routine operations, maintenance, debt service and administration.

Despite these needs, all levels of government, taken together, are currently spending only half of what is needed just to keep this nation's highways serviceable, and let us not forget, the basic four cents per gallon Federal highway user fee has not changed since 1959 and is now worth less than a cent.

We know how serious this nation's highway transportation problem is, but what is its economic impact on the construction industry and the nation? Perhaps we can better appreciate the problem by taking a closer look at just one portion of it -- our national bridge crisis.

In 1970 Congress created a Special Bridge Replacement Program to address the problem of deteriorating bridges. In 1978 Congress extended and expanded the Bridge Program to what is now known as the Highway Bridge Replacement and Rehabilitation Program. From 1970 through 1981, a total of 8,659 bridges throughout the country have been funded under these Bridge Programs.

An impressive record, but are America's bridges in better shape today than in 1970 when Congress first took notice of their deteriorating condition? The answer is an unavoidable "No".

In its recent report to the Congress on the Bridge Program, the Department of Transportation pointed out that of the nearly 558,000 bridges in this country today, almost 249,000, or 45 percent, are considered deficient and in need of rehabilitation or replacement. Of these, 127,000 are judged to be structurally deficient because of deterioration or distress, and 121,000 are considered to be functionally obsolete or inadequate for current requirements.

At the rate bridge repairs have been funded since 1970 when Congress initiated the Special Bridge Program -- 8,659 bridges in eleven years -- it could take more than 300 years to repair or replace this nation's 249,000 deficient bridges!

In very recent years the Department of Transportation has expanded to approximately $1.0 billion annually the financial assistance it provides to the states to repair or replace deficient bridges. However, the Department's latest report to Congress estimates that it will take another $47.6 billion to replace or rehabilitate all the deficient bridges in this country, and that estimate does not include future inflation or the cost of additional bridge repair needs that will develop in the years ahead.

Recently, Pat Choate, author of America in Ruins, warned that "America's public facilities are wearing out faster than they are being replaced," and that "the deteriorated condition of basic facilities that underpin the economy will prove a critical bottleneck to national economic renewal during this decade unless we can find ways to finance public works."

A bridge is, of course, an integral part of the highway on which it is located and when it has been restricted to light vehicles only or has been closed it certainly qualifies as a "critical bottleneck." And what is the cost to a locality when a bridge becomes "a critical bottleneck?" It could literally be staggering. Example: a bridge that normally carries 4,000 autos and 400 trucks per day must be detoured by the trucks because it has been restricted to light vehicles only. If the detour length is ten miles and the truck running costs average $.50 per mile, the 400 trucks per day incur additional total operating costs of $730,000 per year. If the bridge is closed and the 4,000 autos per day must also detour the ten miles, the total additional operating costs per year for the autos, at $.20 per mile, are $2,920,000. The combined additional costs for autos and trucks caused by that "critical bottleneck" are, quite literally, a staggering $3,650,000 per year!

Clearly, increased revenues are needed now to ensure that our highway system, including the bridges on that system, are not allowed to fall into further decay.

And what is the impact of this underinvestment in highway on the transportation construction industry?

Reductions in Federal-aid highway investments are aggrevating a largely inadequate highway funding situation at the state and local levels and have resulted in a highway construction marketplace in which, according to the Business Economics Division of Dun and Bradstreet, more highway and street contractors failed in the first six months of 1981 than failed in either 1977, 1978, 1979 or 1980. In addition, economic conditions in general have forced many construction contractors to close their doors and go out of business.

The extremely competitive nature of today's highway construction industry, coupled with the downturn of the economy, is also reflected in Federal Highway Administration (FHWA) reports which indicate that for 1981, on a national basis, low bids by highway contractors averaged 14.3 percent below the engineer's estimate on Federal-aid highway projects. This compares with a 1980 national average of 8.4 percent below the estimate, a 1979 average of 2.8 percent under and 1978 average of 1.5 percent below.

In addition, 1981 witnessed a national average of 6.0 bids per Federal-aid highway project, compared with 1980's average of 5.1 bids per project and an average of 3.8 bids per project in 1979 and 1978.

While contract prices for Federal-aid highway construction have been largely declining in recent quarters, contractors' labor, material, financing and equipment costs have unfortunately continued to climb. For example, while interest on the investment used to be a minor cost consideration to the contractor, today it can be a contractor's major cost consideration. At today's interest rates that contractor faces the harsh reality of interest payments on a purchased piece of equipment literally exceeding the purchase price of the piece of equipment.

Highway contractors' profit margins, even in a healthy construction market, have historically averaged two percent. Today, many contractors are being forced to bid below cost in an effort to keep their employees working and to make equipment payments. Unfortunately, many of those contractors--the great majority of them small businesses--have reached the point where corporate survival is being imperiled.

And what is the impact on the economy of reduced and deferred investments in our nation's highway system?

At AGC we believe that adequate levels of capital investments in our highway system are essential to a healthy national economy.

As we talk about revitalizing our economy, we must remember that any effort to revitalize must recognize the indelible link between the production of goods and the capability to transport them. The nation's highways carry 100 percent of all livestock shipped to major markets, and nearly all fresh fruits, vegetables, clothing, textiles, leather goods, meat and dairy products. In all, highways carry 21 percent of all intercity ton-miles of freight, nearly 100 percent of all intercity goods and 85 percent of all passenger miles. No port facility could operate without highways and no plant would be built with access to highways. A product's competitive edge can swing on its transportation costs and bad roads inflate those costs.

And what about unemployment? Overall unemployment in the country is now over nine percent. Unemployment in construction, however, is more than twice that level. I would suggest that just as the adequate investment levels in highways will spur business development and investment, so too will the construction and reconstruction of those highways create jobs. The Road Information Program reports that each $1 billion dedicated to road and bridge improvements generates 26,300 direct construction jobs and 36,700 supporting or induced jobs. Clearly, an increased highway program can serve as the cutting edge of any effort to increase employment.

Unfortunately, needed capital investments in highways and bridges cannot be deferred. Unless the work is done as needed, we as a nation will not be faced with the modest costs of repair or rehabilitation, but with the much higher costs of replacement and reconstruction. For instance, a two or three year deferral of highway resurfacing work requires subsequent total reconstruction at triple the cost, plus inflation.

But our basic capital transportation needs in the years ahead will not be only for preserving that which has already been built. While older regions of the nation need capital to repair or replace existing highway facilities, all regions of the country will continue to require new highways to support economic growth.

Indeed, recent trends toward deferring needed capital investments in our highway system, if not reversed, will result in inefficiencies and increased costs which we at AGC believe will erode private sector labor and capital productivity gains and cause an associated decline in growth in the nation's gross national product. In short, the nation's standard of living will decline. As the industry that literally built America, we are compelled to say that such must not be allowed to happen.

How did this situation come about? What are the reasons for the problem?

We believe that the decline in highway investments reflects the growing habit of government at all levels to cut back on construction, rehabilitation, and maintenance in order to balance budgets, hold down the rate of tax growth, and finance a growing menu of social services. When funds are plentiful, capital items are acquired and maintained. When funds are scarce, purchases of capital assets are deferred and maintenance is reduced. In the past, these cuts may have gone unnoticed by the public because their effects were not felt immediately. But more and more, that is not the case. Closed bridges and reduced speed limits are unfortunately becoming commonplace.

Delay is also contributing to the problem. The time consumed in building highway projects is increasingly being determined by government regulations and requirements. Unnecessary delays decrease real capital investments as projects take longer to be put into place.

The solution? There is really only one--to provide for the necessary increases in spending on highways, especially at the federal level.

At the federal level, AGC continues to recommend that:

- The Federal-aid highway program be immediately increased to at least $12 to $13 billion per year.
- There be the equivalent of at least an immediate doubling of the federal highway user fee.
- The cash balance in the highway trust fund be expeditiously reduced to $2 to $3 billion.
- The imposition of obligation limitations, which force the Federal-aid highway program to operate below authorized levels, be discontinued.
- The Highway Trust Fund be extended indefinitely and removed from the unified budget.
- All types of energy used to propel vehicles over the highways be subjected to the imposition of user fees.

AGC strongly supported Secretary of Transportation Drew Lewis' proposal to increase federal highway user fees by the equivalent of 5 cents-per-gallon, which would increase revenues by $5 to $6 billion annually. We did so in the firm belief that this nation's economic future is vitally linked to an adequate transportation system. We did so in the firm belief that Secretary Lewis offered a realistic, workable and equitable proposal that would provide the user fee revenues and the program authorizations that we believe are required to ensure that our highway transportation system will be adequately maintained.

We at AGC had of course hoped that it would have been the decision of Congress and the administration to increase user fees this year and to enact a multi-year highway authorization with funding levels based on that fee increase.

Since a decision on a revenue increase for the highway program has apparently been deferred until next year, the AGC urges this Subcommittee to bring forth a measure that is limited to providing the necessary authorizations and approvals required to ensure continuation of highway and highway safety programs through FY 1983.

AGC does not support including in such a measure the many policy issues contained in current multi-year highway bills before the Congress, such as proposed changes to apportionment formulas.

We favor deferring all such issues until 1983 when, hopefully, they will help to assure maximum support for a multi-year transportation measure that is based on a vitally needed increase in revenues. Including such issues in a one-year measure this year will only assure that it could languish in conference long past October 1.

Our nation's highway system underpins our economy, but it is decaying due to inadequate investment levels. As America's builders, we at AGC are urging public officials at all levels of government to make timely provision for the future. Let us as a nation preserve and improve upon the quality of life that has been the by product of 200 years of investment in our transportation system. There should be no ideological differences of opinion on this critical issue.

Thank you very much.

STATEMENT OF
EDWARD V. KILEY
SENIOR VICE PRESIDENT
AMERICAN TRUCKING ASSOCIATIONS, INC.

My name is Edward V. Kiley. I am Senior Vice President of the American Trucking Associations, Inc. with offices at 1616 P Street, N. W., Washington, D. C.

The organization is a federation with affiliated associations in every state and the District of Columbia, plus thirteen national conferences. In the aggregate we represent every type and class of motor carrier operation in the country both for-hire and private.

We appreciate the opportunity to appear before the Committee and submit the trucking industry's recommendations for financing the present and future needs of the Federal-aid highway program.

Of the many issues being subject to national debate today there is one on which there is obviously a general consensus. There is an urgent need for additional funding of the nation's highway program.

When Congress passed the Federal-aid Highway Act of 1956, it very carefully provided for full Federal financing of the expanded highway program by special taxes on the nation's motor vehicle owners and operators.

The taxes on motor fuel (gas, diesel and special fuel), the tax on lubricating oil, the tax on tires and tubes and on tire retread material, the tax on new trucks, buses and trailers, the tax on truck and bus parts and accessories, and the special weight tax on trucks with a taxable gross weight of more than 26,000 pounds, provide the total source of Federal-aid highway construction financing.

Since its inception, the Highway Trust Fund has received no appropriations from the general fund. It has been a completely self-sustaining, pay-as-you-go, program and has represented no drain on the Federal budget nor has it been at the sacrifice of any other Federal programs.

The Act of 1956 specifically provided that the Federal government's highway appropriations had to be governed by the taxes that were being paid by highway users. If the taxes were not coming in, the highway obligations could not be made. Tax collections determined the maximum level of expenditures.

This self-sustaining, independent method of financing was not unplanned or accidental. It was the result of a carefully worked out program that involved the cooperation and understanding of the Congress and the nation's highway users. Without this understanding, and the acceptance by highway users of the financial responsibility, the expanded highway program would not have been possible.

The highway tax burden, and its specific relationship, fixed by Congress, to the highway program is of particular concern to the trucking industry. Alone, of all the transportation modes, the trucking industry pays special Federal taxes on all of its fuel, lubricants, tires and tubes, equipment, both trucks and trailers, parts and accessories, plus a special weight tax on certain heavy trucks.

The Highway Trust Fund approach has been highly successful. It is a "user charge" program to the ultimate degree. The trucking industry has been a consistent supporter of the program and of the trust fund concept. It must be continued.

Just as it is obvious that there is a demanding need for a higher level of Federal funding it is equally obvious that the additional funding at the Federal level must be sought through the present highway tax structure.

The pressing goals of additional funding are:

1. Completion of the National System of Interstate Highways at the earliest practical date.

2. An adequate 4-R program for the Interstate System.

3. Adequate funding for the other Federal-aid highway systems.

4. A bridge program to address the problem of obsolescence and physical deficiencies of bridges on the Federal-aid systems.

In 1979, the Trust Fund produced more than $7 billion, the highest annual level of collections for the Fund. The taxes that are producing this revenue have not been changed since 1961. Since the principal producer of taxes is the 4 cent per gallon tax on motor fuel (gasoline, diesel and special fuels) revenue from this source has not kept pace with the effect of inflation on increasing highway construction costs.

The second biggest producer of revenue for the Trust Fund is the 10 percent tax on trucks and trailers over 10,000 pounds gvw. This tax is reflective of inflation since the price of new vehicles, like everything else, has felt the impact of rising costs.

This is also true of the 8 percent tax on truck parts and accessories. Because these truck taxes have kept pace with increased prices generally it has meant that for the period 1972 through 1979, the Trust Fund is $2.2 billion better off than would have been the case if the trend of collection of these truck taxes had matched the trend in collections for the motor fuel tax.

Under the present tax program, all trucks have since 1956 paid more than $45.8 billion into the Highway Trust Fund. At the present tax rates all trucks, representing 20 percent of all motor vehicles, are paying 40 percent of Trust Fund revenues. But more importantly the larger trucks, trucks with gross weights above 26,000 pounds are paying approximately 26 percent of Trust Fund revenues, while constituting only 1.1 percent of total motor vehicles and traveling 5.5 percent of the total mileage.

We believe that the large trucks are paying, and have paid, their fair share of the total taxes for the Federal-aid highway program. In fact, we believe the 26 percent of total payments represents more than a fairly assigned share under a rational assignment of highway costs. Later in this statement, this issue of "fair share" is addressed more directly.

In the past, the trucking industry's position on the Federal-aid tax program has generally been confined to a position of urging continuation of the Highway Trust Fund, confining the Trust Fund taxes essentially to those currently in existence, and using the tax revenues for highway related purposes. Together with these basic conditions we have repeatedly indicated our willingness to continue to pay our fair share of whatever additional funding is necessary for a sound, progressive highway program.

The trucking industry has made an enormous investment, through special taxes, in the highway program. We have an important stake in the program's future. Because of this, our industry following our 1981 annual meeting took an historic step. A special industry "Blue Ribbon" Committee was appointed to develop an industry highway program, including specific tax recommendations to provide the additional funding that was needed.

It had become obvious to us, as it was to others, that unless additional funding was made available for the Federal-aid highway program, particularly adequate funding to complete the Interstate System and to keep that system in proper condition, our industry, along with all parts of our economy, will face serious transportation problems.

This is also true if we fail to have adequate funding to move ahead with a program of modernization of the Federal-aid primary system and with adequate financial aid for other programs, including a bridge program.

We have given this matter the most serious consideration. Increased highway taxes are increased costs of doing business, and no business, particularly today, takes on increased costs of doing business too readily. However, we felt that the alternative of an inadequate program presented far more serious consequences.

As a result, our industry adopted at its meeting in February of this year, based on recommendations from our special committee, specific tax recommendations for additional highway funding.

Everyone has talked of the need for additional funding, but few, if any, have said how, specifically, to make the tax changes needed to produce the revenues. We do not believe such generalizations are adequate.

Although our industry adopted an official position early this year, we had not fully publicized our recommendations because we felt that some alterations might have to be made. However, in hearings May 7 before the Subcommittee on Surface Transportation of the House Committee on Public Works and Transportation, we made our specific tax recommendations part of the record.

INDUSTRY RECOMMENDATIONS

The trucking industry recommends the following increases and/or changes in the Highway Trust Fund taxes: effective for fiscal year 1983:

- Increase the 4 cent per gallon tax on fuel (gasoline, diesel and special fuels) to 6 cents a gallon with an additional one-cent increase October 1, 1985.
- Make no change in the current 10 percent manufacturers' excise tax for trucks and trailers over 10,000 pounds gvw.
- Eliminate the current 10 cent per pound tax on tires weighing 50 pounds or less.
- Increase from 10 cents per pound to 15 cents per pound the taxes on tires weighing more than 50 pounds.
- Eliminate the tax on tubes.
- Increase the retread rubber tax from 5 cents per pound to 7.5 cents per pound.
- Increase the current 8 percent manufacturers' excise tax on truck parts and accessories (for trucks over 10,000 pounds) to 10 percent.

- Increase the lubricating oil tax from 6 cents per gallon to 9 cents per gallon.
- Double the present heavy truck use tax by raising it from $3 per thousand pounds (gvw) for trucks over 26,000 pounds to $6.

It is estimated that the additional revenues coming from these tax changes will mean that total Highway Trust Fund revenues in fiscal 1985 will amount to approximately $10.0 billion, or $2.73 billion more than would be accruing at current tax rates.

Under the industry's tax recommendations, passenger cars will continue to pay the fuel tax, the lubricating oil tax, and the retread rubber tax; trucks will continue to pay these taxes as well as the additional taxes paid solely by trucks, and almost all of these taxes by the heavy trucks.

With Trust Fund revenues, under the industry's program, approaching the $10 billion level, this means we can sustain highway funding levels called for in H. R. 6211, the Surface Transportation Assistance Act of 1982. We support an expanded highway program funded by increases in user charges while the Trust Fund balance is drawn down. We expect the Trust Fund will have a balance of $8.5 billion at the beginning of fiscal year 1983. By the end of fiscal year 1986, the balance will be $7.4 billion. The cash flow for the Trust Fund is presented in Table I.

In formulating its tax proposals the trucking industry first considered an "across-the-board" increase of 50 percent in all taxes. This would have produced the necessary revenues and would have kept the heavy truck share at 26 percent of the total. This would have meant increasing the manufacturers' excise tax on new trucks and trailers from 10 percent to 15 percent. We do not believe such an increase, nor any increase at all, in this tax to be desirable or feasible. Such a cost increase would further depress new truck and trailer sales. We need no such additional barriers to economic recovery.

Under the industry tax program, the heavy truck share of total taxes should actually increase beyond the 26 percent. As the economy improves, new truck and trailer sales should increase, as well as sales of truck parts and accessories. This will produce greater truck tax revenue for the Trust Fund.

The industry proposal for a doubling of the special truck tax is tied to a program for a more efficient method of collection. This should produce more revenue, independent of any tax increase, because of the present loss through non-compliance.

We believe the industry's tax recommendations to be fair and equitable and consistent with our position for size and weight relief, of which the tax program is an inseparable part.

Under the present tax structure, combination vehicles would be paying $1.9 billion in 1985. Under the industry's program those vehicles will be paying $600 million more, or $2.5 billion. Of this, $300 million represent increases in truck taxes alone -- manufacturers' excise taxes on new trucks and trailers and parts and accessories, tire tax, and the special heavy truck weight use tax.

This is an additional cost burden which the industry has indicated it is willing to assume in order to continue a sound needed highway program, including size and weight relief. The increases are not small in terms of actual truck operations. For example, a typical 5-axle truck tractor semitrailer combination currently is paying $1,746 annually in Federal taxes, or 2.5 cents per mile. Under the industry proposal, this unit will be paying $2,317 annually, or 3.36 cents per mile.

A typical 5-axle twin-trailer unit currently is paying $1,868, or 2.36 cents per mile. Under the industry proposal, it will be paying $2,468 annually, or 3.16 cents per mile. In both cases the increase is approximately 32.5 percent.

This still represents what we believe to be an overpayment of the heavy truck's fair share of total highway taxes. This overpayment is supported by the industry's incremental study which was submitted for the record of the hearings May 7 before the Surface Transportation Subcommittee of the House Committee on Public Works and Transportation.

The overpayment is also supported by the incremental study submitted by the Secretary of Transportation in his "Final Report on Highway Cost Allocation," which was submitted to the Congress on May 14, 1982.

However, the industry's program, as stated above, is inextricably linked with the industry size and weight program, basic parts of which are contained in H. R. 6211 and to some extent in S. 1402. It would be unreasonable for the industry to seek size and weight relief and at the same time suggest a tax program under which it would be paying less. This we have not done.

FAIR SHARE

The Federal-aid highway program is paid as stated earlier at the Federal level almost in its entirety from special taxes against the nation's highway users, especially in terms of Federal-aid highway construction funding.

This means that the question of equity in highway user taxation, or highway cost allocation, is a question not so much as to level of taxation, but whether one group of motor vehicles is paying more or less than it should into the Highway Trust Fund.

The question at issue at the time the 1956 Act was passed was the relative equity of highway user taxes as they impacted on the various vehicle groups. The Congress, at that time, asked for studies on two different methods of determining general tax equity. One was the "differential costs" or "incremental" method and the other was the "differential benefit" method.

In response to this directive, the Secretary of Commerce submitted reports to the Congress in 1961 and 1965. Under the "differential cost" or "incremental" method there was a finding that the heavier trucks were underpaying their cost responsibility. Under the "differential benefit" approach the heavier trucks were found to be overpaying. Because both methods automatically involved many subjective judgments the Congress balanced the findings and found that the larger vehicles, under the 1961 tax structure were paying their fair share.

However, there was an obvious preference for the "differential cost," or, "incremental" approach and as a result the Congress directed that this method be updated periodically.

The 1965 incremental cost study was updated in 1969 and again in 1975, although the 1975 study was not released at the time. The results of the 1969 incremental study were essentially similar to the 1965 findings. The 1975 study found that heavy trucks were paying more than their share of cost responsibility.

Throughout the period from 1956 through 1975 the Federal Highway Administration (Bureau of Public Roads) was saying to the states and others that the incremental cost method was by far the most valid highway cost allocation approach.

In 1978, following hearings before the Oversight Committee of the U. S. House of Representatives Committee on Ways and Means, the Congress called for another study based on the "costs occasioned" method of measuring highway cost equity. We believe that a reading of past statements in Congressional reports will show that by "costs occasioned" the Congress meant "differential costs" and thus wanted a new incremental study of highway cost allocation.

As part of this statement, we are enclosing a detailed analysis of the "differential cost" or "costs occasioned" approach to show, historically, they are one and the same. We believe the Congress wanted a new, updated, incremental study.

The 1978 Highway Act directed that the Congressional Budget Office be involved in preliminary discussions as to how the Department of Transportation was to proceed in the highway cost allocation study.

The trucking industry, along with other interested groups, participated in early public discussions and hearings concerning the study. These discussions included representatives of the Congressional Budget Office.

It became obvious to the trucking industry that neither the Congressional Budget Office nor the Department of Transportation were considering following the Congressional directive for another incremental study.

An entirely new highway cost allocation method was evolving -- "costs occasioned" was not going to mean "differential" or "incremental" costs.

We strongly objected to the new untested method of cost allocation. It was not going to be an "incremental" study but something entirely different. Our deep concern led us to submit statements to the Department of Transportation outlining our objections. Seeing no change in the study approach, we submitted letters to the Chairmen of the Senate Committee on Environment and Public Works and Finance Committees, and to the House Committees on Public Works and Transportation and Ways and Means Committee, expressing our concern. A copy of this letter is attached to this submission.

As the study progressed, we made repeated submissions to the Department of Transportation voicing our objections and repeating our assertion that the Department was not carrying out a true incremental study. We knew that the method they were following, in addition to not being an incremental method, was a method that could not help but find that heavier trucks were not paying their fair share of highway costs.

Our submissions are acknowledged in the Appendix of the "Final Report on the Federal Highway Cost Allocation Study" (see pages A6-A8). However, with the exception of a few minor deviations, none of our fundamental objections were heeded.

We felt that the Congress should have the results of an incremental study. Accordingly our industry in cooperation with the Motor Vehicle Manufacturers Association retained the firm of CounselTrans, Inc., to conduct an incremental study along the lines of those conducted in the past by the Department of Transportation. This study, "Allocations of Federal Highway Program Costs to Motor Vehicles on the Basis of the Costs They Occasion (A Classic Incremental Analysis)," is referred to earlier in this statement and we ask that it be made a part of the record of these hearings. It shows, as stated, that the heavier vehicles are paying more than their fair share of highway costs under the current tax structure.

Although a true incremental study was not included in the original plans of the Department of Transporation, we are pleased to see that the "Final Report" does include the results of such a study. It is along the lines of the incremental studies, which the Department has favored in the past, and as in the case of our incremental study, it shows the heavier vehicles to be paying more than their fair share of Federal highway user taxes.

Despite this, however, the Department of Transportation has submitted its "Final Report" with its tax recommendations based on its "relative consumption" approach and not the incremental approach.

The result of this new, untested highway cost allocation approach is a recommendation for outrageous increases in heavy truck taxes which amount to confiscation.

For example, whereas the trucking industry recommendations would raise the annual taxes of a typical 5-axle tractor semitrailer combination from $1,746 to $2,317, the DOT recommendations would increase the annual payment to $4,668, a difference of 167 percent.

For a typical 5-axle twin trailer, the industry recommendations would raise the annual taxes from $1,868 to $2,317. The DOT recommendations would increase the annual payment to $4,988, also an increase of 167 percent.

We believe the highway cost allocation methodology on which these enormous tax increases are based to be strongly biased against the heavier vehicles.

The major and vital difference between the findings of the Department of Transportation updated incremental cost allocation study and the new recommended approach shows the dominance of the new allocation philosophy and lies at the heart of the complete disagreement which has existed between the American Trucking Associations and DOT from the beginning of this study in 1979. The fundamental disagreement with this new philosophy rests upon three critical changes which the Department of Transportation has made in their cost allocation methodology, as contrasted to the incremental method which had been developed by the Bureau of Public Roads and the Federal Highway Administration over a thirty-year period.

These three fundamental changes were: 1) Use of equivalent single axle loads (ESALs) to distribute the costs of new pavements among various vehicle classes; 2) Distributing costs of rehabilitation and reconstruction among vehicle classes on the basis of pavement deterioration miles which depend heavily on ESALs; this resulted in unwarranted double counting of heavy vehicle cost responsibility; 3) The assumption that "residual" or "common costs" in the relative consumption approach are the same as the basic road costs used in the traditional incremental approach; this assumption represents a complete change in cost allocation theory.

The most critical component of these changes is the direct use of the equivalent single axle load formula as virtually a direct measure of pavement damage or pavement deterioration. This formula which is sharply geometrical in its application is almost solely the cause of the huge shift in highway user taxes proposed in the recommended cost allocation findings between the heaviest combination vehicles and lighter combinations and straight trucks which weigh more than 26,000 pounds gross weight.

THE USE OF ESALS

The equivalent single axle load concept, or ESAL, was derived from data generated during the AASHO Road Test of the early 1960's. ESAL values have been widely used in pavement design as a means of representing the accumulation of traffic loadings by different types of vehicles in relation to a standard axle load of 18,000 pounds. State highway officials also use ESALs as a convenient way of keeping track of accumulated traffic. The use of ESALs as a measure of pavement consumption, however, is both technically indefensible and substantially biased against heavier vehicles. The crucial question then is why can't their use be justified for direct pavement cost allocation if they can be used in pavement design?

An understanding of why ESAL's cannot properly be used for cost allocation involves a number of rather technical issues and at the same time the application of ordinary common sense. The situation is most dramatically illustrated by a number of state cost allocation proposals where assignments on the basis of ESALs have led to conclusions that 95 to 99 percent of total pavement cost responsibility is attributable to trucks. Kentucky, for example, has allocated its total pavement investment, approximately one billion dollars, by ESALs and "found" that the cost responsibility of all passenger cars, vans and pickups amounted to only $18 million--1.8 percent!! What this means, and it is sheer nonsense, is that if all the trucks were taken off the highways in Kentucky, the State could have built its pavements to accommodate all passenger cars and other light vehicles for only 1.8 percent of what they actually cost. It is also appropriate to note that all truck traffic amounts to about 6 to 7 percent of the total vehicle miles of travel.

Faced with the absurdity of such assignment results based on ESALs, a number of states, rather than discard the improper use of ESALs, have simply taken some arbitrary percentage of the pavement costs and assigned them on some other basis. The new DOT study used ESALs to develop "relative consumption by a particular axle" and used a new pavement deterioration function based on modified ESAL results to distribute rehabilitation costs. It is clear that DOT's assignment is heavily distorted through such use.

The fact that ESAL's have been around for a long time has apparently led many to lose sight of what they are, and what they are not, and to imbue them with a presumption of validity and status that is not open to question. The AASHO Road Test was designed to show the effect of vehicle weight on highways *independent of weather, chemicals, proper maintenance or any other factor other than weight*. They ran over a million axle loadings of up to 30,000 pounds single axle and 48,000 pounds tandem axle in a two-year period with little or no maintenance being performed on any roadway. Despite that enormous pounding, the highway sections built to *modern design standards* were essentially undamaged. Since the modern pavements weren't hurt, they couldn't be used in a formula measuring damage. So the damage formula was derived from the results of what happened to pavements that were deliberately underdesigned for the axle loadings which were run over them. When the Road Test was completed, nearly twenty years ago, most highway engineers knew what the formula was, and what its limitations were. But now suddenly, it is being imbued with mystical powers to measure pavement life and to measure responsibility for pavement rehabilitation and reconstruction.

If, in fact, the ESAL formula can properly measure pavement deterioration or pavement life, then the actual experience of major parkways which ban all heavy trucks should be a useful guide. These parkways should last hundreds of years based on the pavement designs used in their construction. But they didn't. The Baltimore-Washington Parkway had to be resurfaced in twenty-two years despite the fact that the heaviest vehicles it ever carried were a few buses every 24 hours. The Garden State Parkway in New Jersey had a similar history. So the parkways, without heavy truck traffic, lasted about the same time as other roads.

Part of the problem is that the very term "equivalency factor" suggests something that is a measurable, constant and well-established vehicle characteristic that can be used with impunity. After all, if "A" can be said to be "equivalent" to so many of "B," then one should be able to use them like any other algebraic quantity. The case with ESALs is anything but this straightforward. In order to clarify the situation, the pertinent facts are summarized below:

- ESAL values are not a measurable or definitive characteristic of any vehicle as are, for example, axle loads, gross weight, or other measurable attributes of vehicles or their use.

- ESAL values are not constant over time, nor are they independent of the type, thickness and condition of a pavement and its physical environment. Identical axle weights thus do not have the same ESAL value at different times for the same pavement or for different types, thicknesses and conditions of pavement at any time. The ESAL value of a given axle-load application depends on the total number and distribution of all prior axle-load applications to a given pavement and to the age and condition of that pavement. FHWA, however, treats ESALs as if they were simple constants.

- The test sections of the AASHO Road Test that were used as the basis for deriving the ESAL equations were primarily weak pavements that "failed," i.e. reached a terminal PSI (Present Serviceability Index) value, during the Road Test. There is no valid basis for extrapolating the use of ESALs as a measure of pavement performance for strong or adequately designed pavements, or for conditions and environments significantly different from that of the Road Test site.

- The form of the equations used to represent single-axle equivalency factors, an exponential of approximately the 4th power, has been shown[1] to be incorrect and that a theoretically correct representation should produce some form of S-shaped curve. The equations used by AASHO also have a very poor statistical fit to the Road Test data upon which they are based.

A growing body of evidence reveals that ESALs are very poor predictors of pavement performance (or damage) and particularly so for adequately designed pavements. While FHWA's proposed use of ESALs is technically incorrect, the most serious consequence of such use is the magnitude of the bias against heavier axles that stems from the incorrect form and inappropriateness of the AASHO equations.

One indication of this bias is provided by the theoretical work of Luhr & McCullough at the University of Texas at Austin[2] who have developed a set of strain equations, based on elastic-layer theory, to predict the performance of flexible pavements. Using the actual Road Test data, the Luhr & McCullough equations provide a significantly better statistical fit than do the AASHO equations. A comparison of derived equivalency factors for tandem axles of the Luhr & McCullough and the AASHO equations reveals that, for heavy flexible pavements, the AASHO values probably overstate the relative effects of, say 44,000- and 12,000-pound tandems by a factor of 17.5! In contrast to the assumed 4th power relationship of the AASHO equations, the Luhr & McCullough results show an implied relationship of approximately the 2.5 power. As a consequence of the TTI and Luhr & McCullough studies, ATA has called for a complete reevaluation of the actual AASHO Road Test findings to attempt to reach agreement on a new, realistic pavement evaluation formula.

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[1] See for example Chapter 1 of R.L. Lytton, et al, Effects of Truck Weights on Pavement Deterioration, Texas Transportation Institute, College Station, TX, Sept. 1981.

[2] David Luhr & B. Frank McCullough, "Development of a Rationally Based AASHO Road Test Algorithm," Transportation Research Record 760, 1980.

DOUBLE COUNTING OF REHABILITATION AND RECONSTRUCTION COSTS

The second major change incorporated in the new Federal Highway Cost Allocation Study, the entirely new treatment of rehabilitation or reconstruction costs, rests on a fundamental misunderstanding of highway cost allocation equity. DOT's Cost Allocation Study claims "...there is no 'double charging' of pavement costs." Yet, in fact, that is exactly what is done through the use of the new methodology derived by the Department for the allocation of rehabilitation costs.

Whether the new pavement costs are allocated directly through some modification of the ESALs, or by the traditional determination of the actual cost of each additional increment of pavement and distributing those costs among each class of vehicles by axle miles, each method purports to allocate all of the costs of new pavement construction equitably among the various classes of highway users. Both the traditional incremental cost method and the new ESAL consumption method are presumed to allocate new pavement costs to each class of user so that each group pays for an equal level of highway service through its user tax payments. So the argument was made in the 1965 Federal Highway Cost Allocation Study that the basic road used in that study would provide equal service for passenger cars as the heavy duty highway actually built provides for heavy axle load vehicles. With this background in mind the 1965 Highway Cost Allocation Study considered the possible use of equivalent single axle loads as a measure to be used in distributing pavement maintenance costs. The use of ESALs was categorically rejected in the following language:[3]

> In the case of pavement, for example, the AASHO road test equations could be used to compute the portion of the total loss in pavement

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[3] Supplementary Report of the Highway Cost Allocation Study, House Document No. 124, U.S. Congress, February, 1965, pg. 179.

serviceability caused by the axles in each axle-load group. Although this method of computing increments of cost for pavement maintenance might be appropriate if only maintenance were being considered, it is not defensible if responsibility for construction expenditures is also allocated incrementally.

It will be remembered that in using the AASHO road test equations to compute incremental pavement designs for the incremental study of construction costs, pavement life and serviceability were held constant throughouot the calculations for each series of incremental designs. In other words, the first increment of pavement--the one designed for axle loads under 3,000 pounds--will deteriorate the same amount when subjected to 3,000-pound axles as the pavement for mixed traffic will deteriorate under the variety of axle loads found in mixed traffic, the total number of axle applications being the same in both cases. This is also true of the intermediate designs. It is true that the

> tremendous number of light axles cause negligible deterioration of the pavement used for mixed traffic but this is so only because the increments of construction cost allocated to the heavier axles provide a pavement much stronger than the light axles require.

The new Federal Highway Cost Allocation Study alleges that rehabilitation is, in fact, something different from pavement maintenance and therefore, it should be treated by a new methodology. If, in fact, rehabilitation is something basically different from pavement maintenance, then it is in effect a form of new construction and there is no reason for not developing increments of cost of this new construction which are related to the different sizes and weights of the vehicles using the highway facility. While a new incremental cost analysis may well be necessary to compute the increments of costs involved in rehabilitation and reconstruction, there is clearly no technical reason why such an incremental cost analysis could not be made.

Instead of following this procedure, which logically follows from the 1965 Highway Cost Allocation Study, the new Cost Allocation Study uses a second modified ESAL methodology to assign a disproportionate cost of highway rehabilitation or reconstruction to the heaviest combination vehicles. This is not only double counting, but double counting in a manner designed to allocate the greatest portion of highway costs to the heaviest gross weight vehicles.

TREATMENT OF COMMON OR RESIDUAL COSTS

The third change in the basic incremental cost methodology which was made by the Department of Transportation in deriving its new "Recommended" cost allocation method is the substitution of so-called "residual" or "common" costs for the basic road concept of the traditional incremental cost approach. The "basic road" as defined in the 1965 Federal Highway Cost Allocation Study is based on an engineering evaluation of the kind of road necessary to provide equal service for passenger cars and light trucks alone as the pavement actually built provides for heavy duty vehicles. Thus, the basic road is a definable, highway which can be constructed and used.

In contrast, the "recommended" method substitutes residual or common costs for the basic road. The new method divides all highway costs into two broad classes: 1) those costs that are directly and differentially-related to specific vehicle characteristics or their use, e.g., their sizes and weights and miles of travel, and 2) those costs that are independent of any specific vehicle characteristic or its use. The costs related to highway use are generally referred to as "attributable" costs and those independent of any specific vehicle characteristic are defined in the new study as "residual" or "common" costs.

The Department of Transportation appears to take the position that there is no really major difference between these residual costs and the basic road concept of the traditional incremental method. Further, DOT suggests that the definition of attributable costs is as specific and clear-cut as the basic road definition included in the earlier incremental study.

In fact, this is a fundamental revision of the entire incremental method and philosophy as developed in the 1965 Highway Cost Allocation Study. In the incremental method more than 80 percent of total construction costs were expended on the basic highway facilitiy. These costs were then distributed among the vehicle classes by vehicle miles or axle miles per weight class as measures of vehicle use. The new "consumption" approach, however, defines residual costs as those costs which are unrelated to vehicle use. As a consequence, residual or common costs are only those parts of construction expenditures which are not related to vehicle operations. Consequently, in the new cost allocation procedure, only 46.7 percent of total costs in 1985 are residual costs. Thus, the new study is a completely different approach than the previous incremental analysis.

Since common costs do not vary in relation to any characteristics of vehicles or their use, the proportional responsibility of each vehicle is equal to one. The rational allocation of all such costs, consistent with the Congressional mandate, is that each vehicle bear an equal share. The existence of common costs is not evidence of a defect in attribution logic but the simple and direct result of the need in highway design and construction to deal with factors and conditions that are essentially independent of the traffic a highway is intended to carry. Therefore, the use of vehicle miles of travel as an allocater of common costs is not valid since, by definition, common costs are not related to vehicle use. Number of vehicles is the logical allocater for these costs unrelated to vehicle use.

Recently, there has been a growing debate concerning the relative merits of the incremental and relative consumption-based approaches to highway cost allocation. Crucial to the debate is the circumstance that the principle of consistency, and hence fairness, effectively demands that a basic choice be made. If the costs of construction and major rehabilitation are to be distributed differentially, then the costs of normal wear and maintenance should be shared equally among all users--and vice versa. The important policy question thus becomes quite simply: Given the present state of knowledge and all things considered, which approach provides greater assurance of a fair and reasonable cost-occasioned allocation?

To answer this query, it is appropriate to consider what lies behind the call for abandoning an incremental allocation in favor of something entirely new. There appear to be two reasons: First with the Interstate System nearing completion and many sections nearing the end of their original design lives, a significant shift is occurring in Federal highway expenditures away from new construction to repair and rehabilitation. Second is the allegation that heavy trucks are unduly damaging the highways and are thus not paying their fair share of total highway costs--particularly the costs to repair and maintain the system. But should a shift in the mix of highway expenditures make a significant difference? We believe not. There is no reason to suppose that either method, if consistently and reasonably applied should result in radically or even significantly different long-term allocations. The object of each method is to apportion all of the costs in proportion to the way in which they are occasioned. The differences lie principally in the relative difficulty and uncertainties associated with the application of each method and whether the data exists to support the application.

A major charge levied against the incremental method holds that the selection of the passenger car as the basic vehicle is arbitrary and that adding increments of pavement thickness for successively heavier vehicles favors the heaviest vehicles because of the non-linear relationship between pavement thickness and pavement capability.[4] There are three major considerations that this objection overlooks: First, heavier vehicles pay a share of each increment of pavement thickness--including the basic roadway--up to that required by their axle weights. Second, the thicker pavements provided for heavier vehicles have greater resistence to environmental deterioration thus extending pavement life and reducing the costs of repair and upkeep. Third, if the process were reversed and the heaviest vehicles are regarded as the "basic" vehicle with successive "increments" of highway capability being added until the needs of the

[4] The FHWA, and some other writers on the subject, assert that the non-linear form of the design curve represents an "economy of scale" that benefits heavy vehicles in an incremental assignment. This assertion is a perversion of the concept of scale economy and is just "bad" economics. An economy of scale occurs when the production of some good in greater quantity results in a reduction of the unit cost of providing that good. Economies of scale normally result from changes in the production process or the uses of technology that lead to a reduction of labor content or a greater efficiency in the use of materials or productive machinery. While there undoubtedly exist some economies of scale in the production of highway pavements, they are not very significant and are not related to pavement thickness. It is also appropriate to point out, that in the incremental assignment, the appropriate (non-linear) design curve is applied to each vehicle weight class. The non-linearity in pavement design relationships does not bias the results and is not an economy of scale.

passenger cars are met, an entirely different highway system would have to be taken as the basic roadway. In this case, the "basic roadway" while having thick pavements would consist only of those miles of highway--predominantly two-lane--required to connect principal industrial and commercial centers. Such a basic commercial roadway system would also have significantly different geometrics and other characteristics. While no serious attempt of an overall "truck-down" allocation is known, it is not at all unlikely that passenger cars would be found to bear a substantially greater cost responsibility for the existing highway system under this approach in contrast to the traditional incremental analysis. It should be remembered, further, that in a "truck-down" incremental analysis lower weight vehicles would still share in the joint costs of the increments of pavement appropriate to their weight classes.

While the incremental method represents a well-worked out and rational procedure based on the current theory and practice of pavement design, relative consumption-based approaches at the present time do not have either the empirical or theoretical foundations needed for a clear or non-controversial identification of relative cost responsibilities. Notwithstanding the impressive body of data produced by the AASHO Road Test, the AASHO equations cannot be used to predict the long-term performance of adequately designed pavements. The present level of knowledge about the independent effects of environmental (or non-traffic-related) factors on pavement deterioration is not sufficient to quantify how much loss of pavement serviceability should be allocated as a common cost. Under a relative consumption approach this determination of relative traffic and non-traffic-related effects is extremely important. Pavement costs represent the single largest line-item of highway expenditure, and a difference of, say, only 5 percent in the amount of deterioration properly attributable to traffic effects will have a significant impact on the assignment of cost responsibilities. The application of a consumption-based approach requires, furthermore, a sound basis for attributing the relative cost responsibilities of different vehicle weights. As presently formulated, ESALs cannot provide even an approximate measure of "pavement consumption" by different vehicle weights. The strong evidence of the enormous bias in the present formulation of axle load equivalencies cannot be ignored.

Given the present state of knowledge and all things considered, the only reasonable basis for highway cost allocation is a consistently applied incremental method. This conclusion has an importance extending far beyond the present Federal Highway Cost Allocation Study. Each of the individual states has the need to conduct its own cost allocation analysis, and several are currently in progress. The errors and insufficiencies in the present FHWA program, if replicated by the states can only serve to compound the inequity imposed on truck transportation and the economy it serves.

CONCLUSION

The tax increases recommended by the industry during the aforementioned hearing on May 5, are indeed significant -- not only in absolute dollars, but also in relation to the strained present financial status of the motor carrier industry. At year-end 1981, the industry operating ratio stood at 96.7, the highest operating ratio in twenty years. Ordinary income after taxes was 1.75 percent of revenues, or only about half the historically "normal" return. About one-fourth of the carriers in the industry incurred operating losses for the year and an additional 31 percent are only marginally profitable -- with operating ratios of 97 or higher.

The two most recent quarters have been particularly severe. In the fourth quarter of 1981, the industry operating ratio was over 100 and this result continued into the first quarter of 1982 which showed two of every three carriers reporting operating losses.

A substantial number of carriers are no longer in business in this present environment, these involve bankruptcies as well as carriers simply closing their doors. Included among these firms are some of the more familiar and more important names in the industry. At least 190 carriers are gone to date -- involving the loss of over 21,400 jobs. Many other major carriers are under Chapter 11 bankruptcy protection and likewise could fold altogether.

The present motor carrier situation has many root causes. Included are the recession and the manner in which the Motor Carrier Act of 1980 is being administered. The truck size and weight increases that we are recommending can do their part in helping alleviate the present conditions by allowing carriers needed productivity increases. Our recommended tax increases will pay fairly for these productivity gains, but excessive taxes would wholly offset any productivity gains and further depress the industry's financial conditions.

The tax recommendations contained in the "Final Report of the Highway Cost Allocation Study" certainly fit this category. Even if the tax increases were based on a highway cost allocation method that was defensible, which it is not, they represent cost increases that could not possibly be absorbed. It is implied that the tax increases that are recommended can be passed on to the consumer through increased freight charges and, therefore, we should not be alarmed. We cannot accept such a cavalier treatment of what the consumer can or cannot be called upon to pay. The pervasiveness of motor truck service, because of the role it plays in freight transportation, is such that increased costs of truck transportation mean increased costs to the consumer. This is no time to talk about increased consumer costs when we are finally bringing inflation under control. But the major point is that increased costs of any magnitude have no place in our economy when they are based on a misguided approach to highway cost responsibility calling for a punitive assessment of taxes against the trucking industry, resulting in increased costs of everything we eat, wear and use.

Finally, and of significant importance, is the fact that the tax increases at the Federal level that we will be paying are only part of the total bill for increased sizes and weights. The mandating by the Congress of minimum size and weight standards does not, at the same time, mandate the states out of the tax area, and we do not propose that this be done. We know from past history that states' size and weight increases carry a price tag at the state level. This is so whether the states act voluntarily or through a Federal requirement. Thus, the increased Federal tax payments are only part of the total price to be paid.

TABLE I

SURFACE TRANSPORTATION ASSISTANCE ACT OF 1982

H.R. 6211
($ millions)

	FISCAL YEAR 1983	FISCAL YEAR 1984	FISCAL YEAR 1985	FISCAL YEAR 1986
OBLIGATION CEILINGS	$12,200	$12,700	$13,500	$14,400
CASH FLOW				
Balance - Start	$ 8,500	$ 9,400	$ 9,700	$ 8,200
Current User Charge	6,500	7,000	7,300	7,600
Additional User Charge	2,400	2,600	2,700	3,800
Interest on Surplus	1,200	1,000	1,000	900
Outlays	(9,200)	(10,300)	(12,500)	(13,100)
Balance -- End	$ 9,400	$ 9,700	$ 8,200	$ 7,400

Assumptions:

(1) Without a change in tax structure, 1984 collections will equal 1979 collections

(2) Normal 4% growth in tax collections after 1984

(3) Interest is average balance for 2 prior years at 10%

(4) Outlays equal average obligation for 2 prior years

AMERICAN
TRUCKING
ASSOCIATIONS, INC.

1616 P Street, N.W., Washington, D. C. 20036

Edward V. Kiley
Senior Vice President
(202) 797-5221

August 12, 1982

The Honorable Steven Symms
Chairman
Subcommitte on Transportation
Committee on Environment and
Public Works
Room 125
Senate Office Building
Washington, D.C. 20510

Dear Mr. Chairman:

Following my testimony before the Subcommittee on August 10, you asked me to describe how the Department of Transportation Cost Allocation Study methodology is biased against heavy trucks. In responding to that question I described briefly the most obvious way in which the new DOT methodology is biased, which is that it depends directly on the "equivalent single axle load" (ESAL's) calculations from the AASHO Road Test. The use of ESAL's as direct measures of pavement deterioration is strongly biased against heavy axle loads for pavements of adequate strength in normal service. One of the reasons that the ESAL calculations are biased is that the Road Test design intentionally excluded independent environmental effects and age on pavements.

There are, however, several additional ways in which the new DOT methodology is biased against heavy trucks. Some of those additional points of bias are spelled out below. I ask that this more detailed answer be made a part of the record of the hearing.

1. The DOT methodology is biased against heavy combination vehicles because it charges the trucking industry once for building pavements adequate to carry heavy axle loads for the full normal life of the pavement and then charges trucks at an even higher rate a second time for reconstruction. This is a direct contradiction of the incremental theory and the principles of equity. Additional extra charges against heavy trucks result from the fact that the new DOT study does not follow a consistent philosophy of "measuring equity" among highway user groups, but picks and chooses among different methodologies in the allocation of different cost elements.

2. The methodology is biased against heavy trucks because it assumes the technology exists to define "highway damage" by standard units of measure, and that valid and consistent measures of the relative effects of traffic,

environment, and chemical forces are presently available. None of these pre-requisites of a valid direct use, or "life cycle" assignment of cost responsibility presently exist. DOT simply assumes that the ESAL's are the proper, direct measures of pavement consumption costs but it can be mathematically demonstrated that they are not.

3. It is biased against heavy trucks because it assumes that significant differences in the effects of different axle loads on pavements were established at the AASHO Road Test. In fact, the pavement research report states that significance cannot be attributed to computed differences in axle load effects because no test "loops" were duplicated at the experiment.

Thank you for your consideration of our presentation. At the hearing, you indicated that the Committee may have additional questions which will be submitted to me in writing. We will be happy to attempt to answer any further questions as soon as they are received.

Sincerely,

E V Kiley

E. V. Kiley

/arg

AMERICAN
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PRESIDENT
Bennett C. Whitlock, Jr.
(202) 797-5212

April 17, 1980

The Honorable Jennings Randolph
Chairman, Committee on Environment
and Public Works
U. S. Senate
Senate Office Building, Room 3203
Washington, D.C. 20510

Dear Senator Randolph:

The American Trucking Associations is deeply concerned about the direction and the progress of the Highway Cost Allocation Study being conducted by the Federal Highway Administration as required by Section 506 of the Surface Transportation Assistance Act of 1978. As a consequence, we submitted the attached statements for the record at the Federal Highway Administration Public Hearing held on April 11, 1980 to receive comments concerning the First Progress Report on the Federal Highway Cost Allocation Study as submitted to the Congress March, 1980.

After the Secretary of Transportation submitted the DOT's proposed Study Plan in June of 1979, we had submitted for your information and to the Department of Transportation a report prepared for ATA by our consultant CounselTrans, Incorporated entitled "Technical Inadequacies and Biases of the Highway Cost Allocation Study Plan." Our analysis, as its title suggests, outlined a number of major weaknesses in the proposed Study Plan. As our statement submitted at the hearing on April 11 indicates, we find that the First Progress Report shows little if any change in the proposed Study Plan has occurred in the nearly one year since the DOT's plan was prepared.

The Department of Transportation indicates that the Cost Allocation Study will rely heavily on new and untested methods of highway cost allocation, despite the long established basis for conducting a traditional incremental cost analysis. Our concern over the use of this untested new cost allocation methodology has been heightened by indications from the Federal Highway Administration that the Department may issue a preliminary cost allocation study by early 1981, a year ahead of the scheduled January 15, 1982 completion date. The DOT indicates that Congress is pressing for an early highway cost allocation statement.

ATA believes that if there is to be an early statement on the Highway Cost Allocation Study, it should be conducted along the well-established lines of a traditional incremental analysis. Development of a new and untested theory within a brief period of months would provide no time for careful review prior to submission to your Committee. On the other hand, much of the technology required to conduct a traditional incremental analysis is already available in computer systems within the Department of Transportation. Accordingly, we urge that your Committee carefully consider the proposed methodology of the Highway Cost Allocation Study so that you may be assured that a proper "costs occasioned" highway cost allocation study is conducted by the Department of Transportation. We urge your careful review of these additional comments by ATA concerning the scope and progress of the study.

Sincerely yours,

Bennett C. Whitlock, Jr.

BCW/arg

Attachments
Identical Letter to:
Honorable Russell B. Long, Chairman, Senate Finance Committee
Honorable Harold T. Johnson, Chairman, House Public Works Committee
Honorable Al Ullman, Chairman, House Ways and Means Committee

THE HISTORICAL MEANING OF THE TERM "COST OCCASIONED," AS USED IN AN INVESTIGATION OF:

> "The costs occasioned in design, construction, rehabilitation and maintenance of Federal-aid highways by the use of vehicles of different dimensions, weights and other specifications, and by the frequency of such vehicles in the traffic stream;"

One of the questions which has arisen regarding the highway cost allocation study directed by the Congress in Section 506 of the Surface Transportation Act of 1978 is the definition of the term "costs occasioned," as used in Sub-paragraph (1) of the Section quoted above. The question is crucial because the primary study plan advanced by the Secretary of Transportation, in response to the Congressional directive, is based on concepts radically different than those developed and employed by the Federal Highway Administration for the Section 210 study directed by the Federal-aid Highway Act of 1956.

In general, the current DOT study plan is based on the assignment of costs in proportion to certain "relative use and relative demand" parameters. This is contrasted to the prior Section 210 study, which assigned costs on the bases of the increments of extra highway expenditures which were necessary to accommodate vehicles of different sized and weights, a methodology called a "differential cost" or "incremental cost" allocation approach.

The specific language of Section 506 of the 1978 Act and Section 210 of the 1956 Act is attached. The pertinient language is contained in Sub-paragraphs (1) and (2) of Paragraph (a) of the 1978 Act and in Sub-paragraphs (1) and (2) of Paragraph (b) of the 1956 Act.

The referenced Sub-paragraph (2) of both acts clearly establishes the intent of the Congress as an investigation of: "the proportionate share of such design, construction, (rehabilitation), and maintenance costs attributable to each class of persons (and vehicles) using such highways..." with reference in both Acts being to the Federal-aid systems. The 1978 Act dropped any reference to a "benefits" study, and added the term "rehabilitation," but the basic thrust of both acts is identical. Congress wants to know how vehicle size and weight influences highway expenditures.

The difference in phrasology which has become important is the language of the referenced Sub-paragraph (1) of each Act.

The 1978 Act states:

(1) The costs occasioned in design, construction, rehabilitation and maintenance of Federal-aid highways..."

The 1956 Act states:

(2) the effects on design, construction and maintenance of Federal-aid highways..."

Thus, the 1978 Act uses the phrase "the costs occasioned in..." as contrasted to the language of the 1956 Act which is "the effects on... Since the subsequent Sub-paragraph of both Acts directs the determination of the proportionate share of such costs attributable to vehicles different sizes and weights, it would appear that the intent of Congress was consistent in both instances.

The exposure of the Congress to the term "cost occasioned," with particular reference to its relationship to the incremental cost allocation study emanating from the 1956 Act, is well documented in the series of reports the FHWA made to the Congress during the conduct of the Section 210 study.

In total, the Secretary of Commerce made six reports on the study. The number of reports was so large because of the need to delay the primary incremental study to permit it to include the results of the AASHO Road Test.

The reports were:

The First Progress Report of the Highway Cost Allocation Study, March 4, 1957.
The Second Progress Report of the Highway Cost Allocation Study, March 3, 1958.
The Third Progress Report of the Highway Cost Allocation Study, March 2, 1959
The Fourth Progress Report of the Highway Cost Allocation Study, March 8, 1960.
The Final Report of the Highway Cost Allocation Study, January 16, 1961.
Supplementary Report of the Highway Cost Allocation Study, March 25, 1965.

An examination of each of these reports reveals that at least once in all of them, except the Fourth Progress Report, that the Secretary of Commerce used the term "cost occasioned" as a descriptive phrase for the differential cost or incremental cost study that was under way. Thus, the Congress was being told that for the purpose of highway cost allocation studies, the term "the costs occasioned" was synonomous with the term "the effects on."

Further, and most importantly, the Secretary of Commerce established that the proper use of the AASHO Road Test results in highway cost allocation, including the axle load equivalency factors, was through the engineering design procedures employed in the incremental cost study methodology. While the engineers specifically waited for the results of the ASSHO Road Test before completing the incremental cost allocation study, and had the opportunity of utilizing the "relative damage" approach in response to the Congressional directive, they did not do so. And they did not do so because the "relative damage" axle load ratios had no proportional relationship to the effect that vehicle size and weight had on the costs of the design, construction and maintenance of highways. In fact, in the instance of their review of maintenance, the engineers specifically rejected the thought that the "relative damage" or "axle load equivalency factors" could be used as a direct measure of relative cost responsibility.

Selected portions of the various reports of the Secretary of Commerce re: the Section 210 study are attached to this review. The use of the term "cost occasioned" is highlighted where appropriate, as is the portion relating to "maintenance" and the "relative damage" concept.

The record is thus clear as to the historical position of the FHWA regarding the interpretation of "cost occasioned" vis-a-vis highway cost allocation methodology. It has, in fact, not changed in the current investigation, as at several places in the primary study plan, questions are raised about the "relative damage and relative demand" concepts presented to them by the Congressional Budget Office as guidelines for the conduct of the study. Specifically, on page 28 of the study plan, the statement is advanced that the "theoretical soundness of these procedures will be tested in both the main study and the supplemental studies."

Even though the posture of the FHWA in the highway cost allocation arena is well established, there can still be a body of opinion that would not necessarily coincide with the FHWA. In recognition of this, the FHWA issued a research contract, DOT-FH-11-8807, to further explore the entire issue of the proper allocation of highway costs.

The contract was with Wilbur Smith and Associates, and in 1976 the consulting firm produced a report titled, "DEVELOPMENT OF STRATEGIES AND PROCEDURES FOR HIGHWAY COST ALLOCATION, INTERIM REPORT, REVIEW OF PROCEDURES."

Of direct pertinence to this discussion is Chapter III, "Highway Cost Allocation to Highway Users." The discussion in this chapter identifies six major concepts that historically have been used to address the issue of determining equity in assigning highway costs among vehicles of different sizes and weights. They are:

Gross Ton-Mile Method
Operating-Cost Method
Space-Time Method

Differential-Benefits Method
Incremental Method
Cost-Function Method

The first four concepts were identified as basically "benefit received" or "value-of-service" methods. The Incremental Method is specifically identified as based on the "cost-occasioned" principle, and the cost-function method is identified as a less complicated outgrowth of the Incremental Method. Throughout this entire chapter, the Incremental Method is consistently identified as a cost-occasioned approach.

More importantly, there is no reference to other "cost occasioned" methodologies, such as the primary methodology advanced by the Secretary of Transportation in response to the language of Section 50[illegible] although the Space-Time approach was said to have some similarity.

With such a blanket agreement as to the meaning of "cost occasioned," as related to highway cost allocation studies, it is a proper question to ask how another definition could be considered.

The first record I have of the new approach is in the series of studies conducted by the Urban Institute into the issue of highway cost allocation, under contract with the Association of American Railroads. Specifically, Task II, "An Analysis of Road Expenditures and Payments by Vehicle Classes," first advances the approach adopted by the CBO in their guidelines. In many respects, The Urban Institute based their rationale on economic theory rather than engineering design.

In these studies, the authors define those costs which can be traced to a specific class of user as "occasioned costs" and those that cannot be so identified as "common costs." The procedures advanced as allocation methodologies are the same "relative damage" and "relative demand" approach contained in the CBO Guidelines, and subsequently in the DOT primary study plan. These studies by the Urban Institute were published in March of 1977.

SURFACE TRANSPORTATION ASSISTANCE ACT OF 1978

SEC. 506. REQUIREMENTS FOR A COST ALLOCATION STUDY.

(a) Study Directed.—The Secretary of Transportation is hereby authorized and directed, in cooperation with the State highway departments, to undertake a full and complete investigation and study of—

(1) the costs occasioned in design, construction, rehabilitation, and maintenance of Federal-aid highways by the use of vehicles of different dimensions, weights, and other specifications, and by the frequency of such vehicles in the traffic stream;

(2) the proportionate share of such design, construction, rehabilitation, and maintenance costs attributable to each class of persons and vehicles using such highways; and

(3) the need for long-term or continuous monitoring of roadway deterioration to determine the relative damage attributable to traffic and environmental factors.

(b) Evaluation by Congressional Budget Office.—To assist the Secretary of Transportation in the conduct of the investigation and study authorized and directed by subsection (a) of this section, the Congressional Budget Office is hereby authorized and directed to make an evaluation of—

(1) the procedures to be employed in determining the equitable allocation of highway costs;

(2) the information to be collected to apply the procedures identified pursuant to paragraph (1);

(3) any special studies essential to the conduct of the investigation which can be identified and completed within the deadlines established by this section; and

(4) the procedures to be employed to ensure a continuing equitable allocation of highway costs after study termination.

The Congressional Budget Office shall report its findings to the Congress and to the Secretary of Transportation within 90 days after the date of the enactment of this section. These findings shall be employed by the Secretary as guidelines in the design of the investigation and study authorized and directed by subsection (a) of this section.

(c) Reports.—

(1) Within 180 days after the date of the enactment of this section, the Secretary of Transportation shall report to the Congress on a plan for the investigation and study. Such plan shall include, but not be limited to, the data to be gathered; the sources of such data; the method to be used to allocate costs; the method to be used to attribute revenues; the criteria to be employed in arriving at an equitable distribution of the tax burden; the agency or agencies responsible for performance and review of the study; a projected schedule for study performance; and the estimated costs of the study.

(2) On or before January 15, 1980, and January 15, 1981, the Secretary of Transportation shall report to the Congress the progress which has been made in carrying out the study and investigation required by this section. Such progress reports shall include, but not be limited to, a discussion of any changes from the study plan as submitted under provisions of this section and of preliminary findings of the investigation.

(3) The Secretary shall report to the Congress the findings and recommendations of the study no later than January 15, 1982. Such recommendations shall include any alternative tax structures which the Secretary believes would more nearly acheive an equitable distribution of the tax burden among classes of persons and vehicles using Federal-aid highways, and the projected impact of such structures on affected industries and other users.

FIRST PROGRESS REPORT OF THE HIGHWAY COST ALLOCATION STUDY

INTRODUCTION

In pursuing a task of such grave importance as the inquiry called for under section 210 of the Highway Revenue Act of 1956 it is imperative that the full significance of the congressional mandate should be understood. It is proper therefore to repeat at the outset of this report the text of that section, which is as follows:

SEC. 210. INVESTIGATION AND REPORT TO CONGRESS.

(a) PURPOSE.—The purpose of this section is to make available to the Congress information on the basis of which it may determine what taxes should be imposed by the United States, and in what amounts, in order to assure, insofar as practicable, an equitable distribution of the tax burdens among the various classes of persons using the Federal-aid highways or otherwise deriving benefits from such highways.

(b) STUDY AND INVESTIGATION.—In order to carry out the purpose of this section, the Secretary of Commerce is hereby authorized and directed in cooperation with other Federal officers and agencies (particularly the Interstate Commerce Commission) and with the State highway departments, to make a study and investigation of—

(1) the effects on design, construction, and maintenance of Federal-aid highways of (A) the use of vehicles of different dimensions, weights, and other specifications, and (B) the frequency of occurences of such vehicles in the traffic stream.

(2) the proportionate share of the design, construction, and maintenance costs of the Federal-aid highways attributable to each class of persons using such highways, such proportionate share to be based on the effects referred to in paragraph (1) and the benefits derived from the use of such highways, and

(3) any direct and indirect benefits accruing to any class which derives benefits from Federal-aid highways, in addition to benefits from actual use of such highways, which are attributable to public expenditures for such highways.

(c) COORDINATION WITH OTHER STUDIES.—The Secretary of Commerce shall coordinate the study and investigation required by this section with—

(1) the research and other activities authorized by Section 10 of the Federal-Aid Highway Act of 1954, and

(2) the tests referred to in section 108 (k) of this Act.

(d) REPORTS ON STUDY AND INVESTIGATION.—The Secretary of Commerce shall report to the Congress the results of the study and investigation required by this section. The final report shall be made as soon as possible but in no event later than March 1, 1959. On or before March 1, 1957, and on or before March 1, 1958, the Secretary of Commerce shall report to the Congress the progress that has been made in carrying out the study and investigation required by this section. Each such report shall be printed as a House document of the session of the Congress to which report is made.

(e) FUNDS FOR STUDY AND INVESTIGATION.—There are hereby authorized to be appropriated out of the Highway Trust Fund such sums as may be necessary to enable the Secretary of Commerce to carry out the provisions of this section.

SUPPLEMENTARY REPORT OF THE HIGHWAY COST ALLOCATION STUDY

LETTER OF TRANSMITTAL

The Secretary of Commerce,
Washington, D.C., March 24, 1965.

Hon. John W. McCormack,
Speaker of the House of Representatives,
Washington, D.C.

Dear Mr. Speaker: Transmitted herewith is the Supplementary Report of the Highway Cost Allocation Study which is submitted pursuant to the provisions of section 210 of the Highway Revenue Act of 1956 (70 Stat. 387), as amended by section 1 of the act approved August 28, 1958. This report is a supplement to the final report of the highway cost allocation study which was submitted to you on January 13, 1961, and published as House Documents 54 and 72, 87th Congress, 1st session. This submittal completes the work undertaken in compliance with section 210 of the Highway Revenue Act of 1956.

The purpose of this study as set forth in subsection (a) of said section 210 is to make available to the Congress information on the basis of which it may determine what taxes should be imposed by the United States, and in what amounts, in order to assure, insofar as practicable, an equitable distribution of the tax burden among the various classes of persons using the Federal-aid highways or otherwise deriving benefits from such highways. In order to carry out this purpose, the Secretary of Commerce, in cooperation with other Federal officers and agencies and the State highway departments, was directed to make a study and investigation of—

(1) the effects on design, construction, and maintenance of Federal-aid highways of the use of vehicles of different dimensions, weights, and other specifications, and the frequency of occurrences of such vehicles in the traffic stream;

(2) the proportionate share of the design, construction, and maintenance costs of the Federal-aid highways attributable to each class of persons using such highways; and

(3) any direct and indirect benefits occurring to any class, in addition to benefits from actual use of such highways, which are attributable to public expenditures for these highways.

The Secretary of Commerce was also required to coordinate this study with the tests referred to in section 108(k) of the Federal-Aid Highway Act of 1956 conducted by the Highway Research Board of the National Academy of Sciences, in cooperation with the Bureau of Public Roads (generally know as the AASHO road test), carried out at Ottawa, Ill. The analysis of results of the AASHO road test had not been completed at the time of submittal of the final report of the highway cost allocation study. The supplementary report was undertaken after completion of the AASHO road test and the publication of its findings. These findings were utilized in the allocation, among vehicles of different dimensions and weights, of Federal-aid highway cost responsibility by the incremental method, which purports to distribute cost responsibility among vehicle groups in proportion to the costs occasioned by their occurrences in the traffic stream. A revised allocation by the differential-benefit method, which purports to distribute cost responsibility among vehicle groups in proportion to the benefits derived from their use of the highways, was also completed.

Sincerely yours,

John T. Connor,
Secretary of Commerce.

Federal-aid system	Federal share of construction expenditures	Total maintenance costs
	Percent	*Percent*
Interstate	74.1	14.1
Federal-aid primary	17.7	37.5
Federal-aid secondary	8.2	48.4
Total	100.0	100.0

Nearly three-fourths of the Federal-aid expenditures are concentrated on the 41,000-mile Interstate System but this limited mileage accounts for only 14 percent of the maintenance costs. At the other end of the scale, only 8 percent of the construction expenditures are spread over the extensive Federal-aid secondary system which generates nearly half the maintenance costs.

Incremental variations of maintenance costs

To the extent that maintenance expenditures are incurred to repair the damage or deterioration caused by traffic it is possible to take the position that increments of maintenance cost stem from differences in the rate at which vehicles of different types and weight cause deterioration. In the case of pavement, for example, the AASHO road test equations could be used to compute the portion of the total loss in pavement serviceability caused by the axles in each axle-load group. Although this method of computing increments of cost for pavement maintenance might be appropriate if only maintenance were being considered, it is not defensible if responsibility for construction expenditures is also allocated incrementally.

It will be remembered that in using the AASHO road test equations to compute incremental pavement designs for the incremental study of construction costs, pavement life and serviceability were held constant throughout the calculations for each series of incremental designs. In other words, the first increment of pavement—the one designed for axle loads under 3,000 pounds—will deteriorate the same amount when subjected to 3,000-pound axles as the pavement for mixed traffic will deteriorate under the variety of axle loads found in mixed traffic, the total number of axle applications being the same in both cases. This is also true of the intermediate designs. It is true that the tremendous number of light axles cause negligible deterioration of the pavement used for mixed traffic but this is so only because the increments of construction cost allocated to the heavier axles provide a pavement much stronger than the light axles require. It is evident that the only increments of maintenance cost that are of concern in an incremental study of both construction and maintenance costs are those which reflect differences in the cost of maintaining highways designed for and used by light axles and those designed for and used by each successively heavier group of axles.

Appraising the effect that variation in vehicle size or weight has on highway maintenance and the concomitant costs differs from a similar evaluation of capital outlays for construction. The cost of construction items is related to the design standards used. The differential requirements of vehicles of different types, sizes, and operating characteristics are considered in the structural and geometric

FINAL REPORT OF THE
HIGHWAY COST ALLOCATION STUDY

directive regarding highway costs is restricted to motor vehicle users only—we are required to study—

> * * * the effects on design, construction, and maintenance of Federal-aid highways of (A) the use of vehicles of different dimensions, weights, and other specifications, and (B) the frequency of occurrence of such vehicles in the traffic stream.

The instructions regarding the study of benefits, on the other hand, apply to users and nonusers alike. This difference between the two directives is not construed to preclude some inquiry into highway costs that may have been occasioned, in part at least, by nonuser interests or objectives; nor to prohibit the employment of alternative methods of study (e.g., the ton-mile study, the relative-use study, and the earnings-credit study, described later) that are only indirectly related to highway cost and benefits but have the sanction of use in previous highway finance and taxation studies.

On the subject of the cost responsibility of vehicles of different "dimensions, weights, and other specifications," the implication of subsections (b)(1) and (b)(2) is that the study must mediate between findings with respect to cost occasioned and findings with respect to benefits derived, by the use of such vehicles. To accomplish this a method of averaging weighted by consideration of the relative accuracy and authoritativeness of the alternative solutions achieved, is the indicated procedure. In the actual working out of the analysis the use of four methods of allocating motor-vehicle cost responsibility has been of great aid in arriving at reasonable findings.

MAINTENANCE COSTS

Subsection (b)(1) speaks of the effects on maintenance costs as well as those on design and construction; and subsection (b)(2) treats of "* * * the proportionate share of the design, construction, and maintenance costs * * *". Federal highway aid is authorized only for the construction (including right-of-way) of highways on the Federal-aid systems. The problem of allocation of the tax burden has been restricted to a proper assignment of responsibility for construction costs. It is clear, however, that the Congress wished to be informed of the relative responsibility of vehicles of different dimensions and weights for the costs of maintaining the Federal-aid systems. A special substudy was made of this subject.

BENEFITS TO OTHER THAN HIGHWAY USERS

It is well to look closely into the mandate of section 210 on the subject of the relative benefits derived by motor-vehicle users and other interests. The statement of purpose in subsection *(a)* defines as an objective the—

> * * * equitable distribution of the tax burdens among the various classes of persons using the Federal-aid highways or otherwise deriving benefits from such highways.

Subsection (b)(3) requires the making of an investigation of—

> * * * any direct and indirect benefits accruing to any class which derives benefits from Federal-aid highways, in addition to benefits from actual use of such highways, which are attributable to public expenditures for such highways.

Thus the motor-vehicle users are brought into bold contrast with other beneficiaries of the highways, and the problem of an equitable distribution of the highway tax burden between them is brought into question.

Plans for completion of the highway cost allocation study

The extension of the time limit for the final report of the study to January 3, 1961, has made it possible to conduct a more thorough analysis of the vast body of data collected for use in this study. The results of the AASHO road test in Illinois will become available for use in the allocation of costs in proportion to the highway costs occasioned by vehicles of different dimensions and weights. Further work in the field of vehicular or user benefits will insure their accurate evaluation for use in the allocation of costs in proportion to the benefits received by the users of vehicles in different size and weight groups. Further results from economic impact studies, together with the vehicular benefit study, will help to throw more light on the relevance of highway benefits, both user and nonuser, to the highway cost allocation problem.

vehicles with the miles of 1957 travel on the various Federal-aid highway systems. The data will be analyzed to determine for each vehicle type, highway system, and design volume group such things as the miles of travel by vehicles in each of several registered gross weight groups, by type of operation (ICC, other-for-hire, etc.), by type of fuel used and, of course, the miles of travel by axles of different weights. It is expected that 3 months will be required to complete this detailed computation program following receipt of data from all the States during March 1958.

INCREMENTAL DESIGN STANDARDS

This phase of the study is necessary to those analyses of costs occasioned that seek an allocation among size and weight groups of vehicles on the basis of their differential design and construction requirements. Some of these were described in detail at pages 64–89 of the first progress report. An inquiry designed to elicit, for each Federal-aid system and road type, the following information regarding the design and cost of roadway items other than structures was prepared during the past year:

1. The standard designs used for mixed traffic, classified according to those used for high, normal, and low percentages of heavy vehicles.
2. Judgment as to the designs that would be adequate for traffic in which the greatest loads would be those of the heavier 2-axle- 4-tire trucks.
3. Judgment as to the minimum practical design for traffic consisting of passenger cars and very light trucks of similar loading and operating characteristics.
4. Construction quantities and costs per mile typical of the designs called for in items 1 through 3, above.
5. Estimates on the designs and costs required to accommodate single and tandem axle loads heavier than those now permitted in most States; namely, the 22,400- and 30,000-pound single-axle loads and the 40,000- and 48,000-pound tandem-axle loads to be employed in the AASHO road test.
6. Subsidiary information as follows: (*a*) Opinion as to the relative pavement-strength requirements of single and tandem axles and (*b*) the findings of research or experience pertinent to the inquiry.

The information obtained by means of this inquiry, together with the findings of road test 1, Maryland, the WASHO road test, and other research, will be used as a guide in arriving at incremental cost factors that can be used to break down the estimated cost of improving the Federal-aid systems into the increments attributable to vehicles of different types, dimensions, and weights.

The inquiry was sent to the Public Roads field offices for distribution to the State highway departments by circular memorandum dated January 24, 1958. It was distributed to national associations and other groups having a commercial, economic, governmental, or social interest in the highway cost allocation study during February 1958. Inquires dealing with bridge costs and maintenance costs are in the process of preparation and will be distributed soon.

Each such report shall be printed as a House document of the session of the Congress to which the report is made.

This first progress report is devoted primarily to a discussion of the problem of equitable allocation of the Federal-aid highway tax burden, and an exposition of the methods of study by means of which it is intended to pursue the investigation. It closes with a summary of the organization of the project, the plans for its execution, and the progress up to this time.

Sincerely yours,

SINCLAIR WEEKS,
Secretary of Commerce.

THE FEDERAL HIGHWAY ADMINISTRATOR,
Washington, February 27, 1957.

The honorable, the SECRETARY OF COMMERCE,
Washington, D. C.

DEAR MR. SECRETARY. I transmit herewith the first progress report on the study and investigation required under section 210 of the Highway Revenue Act of 1956, approved June 29, 1956. This report was prepared in compliance with section 210 (d) of the act, which provides that reports of progress of the study shall be transmitted to the Congress not later than March 1 in each of the years 1957 and 1958, and that a final report shall be transmitted not later than March 1, 1959.

The objective of this study is to provide the Congress with information on the basis of which it may determine what taxes should be imposed and in what amounts, in order to assure, insofar as practicable, an equitable distribution of the tax burden for the support of the Federal-aid highway program. In pursuance of this objective it will be necessary to inquire into both the highway costs occasioned and the benefits derived by the use on the Federal-aid highways of vehicles of different dimensions, weights, and other specifications. It is further directed that a study be made of any benefits, direct or indirect, that may be derived by any class from public expenditures on the Federal-aid highways, other than through direct use of such highways.

Following an introduction and summary, the body of the report is in three sections. Part I is a treatment of the problem of equity in highway taxation, with special emphasis on its Federal aspects. Part II is a discussion of the methods of research and analysis by which it is hoped that equitable allocations of cost responsibility for support of the Federal-aid highway program may be derived. In part III the planning and organization of the project are described and the work accomplished to date is summarized.

Sincerely yours,

B. D. TALLAMY,
Federal Highway Administrator.

COUNSELTRANS INC.

A Report To

The American Trucking Associations, Inc.
The Motor Vehicle Manufacturer's Association

ALLOCATIONS OF FEDERAL HIGHWAY PROGRAM COSTS TO MOTOR VEHICLES ON THE BASIS OF THE COSTS THEY OCCASION

(A Classic Incremental Analysis)

By

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EXECUTIVE SUMMARY

National highway cost allocation studies provide the basis to evaluate the equity of Federal highway user taxes paid by various motor vehicle classes and weight groups to support the Federal-aid highway programs. The last nationwide highway cost allocation study was completed in 1965 and has served as the optimum highway cost allocation model since that time. Cost occasioned methodology, and particularly the incremental analysis as developed during the 1965 study, has long been accepted by experienced highway cost allocation professionals as one of the most supportable bases for equitable highway cost allocation.

Relative responsibilities for highway costs are based on a ten-year program to correct critical existing deficiencies on the Federal-aid highway systems as identified by the state highway agencies with supplemental information from recent national reports on needs and conditions of the highway systems. Additional deficiencies expected to accrue on presently adequate Federal-aid highways, such as result from gradual surface deterioration, were not included in the cost estimates.

This use of actual highway needs as a basis for determining cost responsibilities is superior to a selected program basis, which is based on judgment as to the direction of future Federal highway programs. Such judgments may not correctly anticipate the actions of Congress and hence may result in incorrect cost allocations. The needs basis presumes Congressional actions ultimately will be directed toward meeting the most pressing needs.

The total estimated cost of correcting existing critical deficiencies on the Federal-aid systems was estimated at $232.1 billion in present dollars--no provision has been made for inflation which can be expected to increase these needs. The following shows the distribution by highway system.

	Total Costs (Billions)		
	Rural	Urban	Total
Interstate [1]	$ 30.6	$ 30.0	$ 60.6
Primary	54.2	23.8	78.0
Secondary/Urban	43.0	50.5	93.5
Total	$127.8	$104.3	$232.1

1/ Interstate needs are based on state and FHWA estimates of costs to complete the system, less funds already apportioned. These estimates are based on current definitions of completion and relevant standards. In view of the unending increases in costs, representations have been made for some rollback of these requirements. This should not significantly affect relative cost responsibilities. (See Report to Congress: The 1981 Estimate of the Cost of Completing the Interstate System, U.S. DOT.)

The existing critical needs costs (1980 dollars) were expressed as average annual costs for the 10-year period 1981-1990 and used in the incremental analysis to assign cost responsibility to vehicle classes and weight groups. Only the Federal share of the existing needs, as determined by the current Federal-aid matching formulas, was used to designate Federal highway user responsibility. The average annual (1981-1990) Federal share of the existing needs was estimated to be $17.8 billion.

Total Federal highway user revenues were also estimated for the 10-year period, with 1985 as the mid-year. Based on existing tax sources and rates, $8.8 billion were estimated to be paid into the Federal Highway Trust Fund annually after payment of allowable refunds. This amount does not include any interest that will accrue from the investment of Trust Fund revenues, presently approaching $1 billion per year in additional revenue.

Since estimated highway needs substantially exceed anticipated revenues, highway cost responsibilities were compared with annual user revenues paid into the Trust Fund on a percentage basis. The incremental analysis, used in this study, follows closely the specific procedures and cost influence decisions of the last national cost allocation study reported to Congress in 1965. This is the only analytical method applied or proposed to date which bases relative vehicular responsibilities on proportionate cost actually incurred by the government to provide for their specific accommodation with consistent attention to the way demands for highway expenditures actually are produced. Althougn some philosophies, based on benefits received from highways, would distribute highway program cost responsibilities among highway users and non-users to some degree, these philosophies have not been incorporated in this analysis. All program costs have been treated as user responsibilities.

Results of the incremental analysis provide a firm basis for comparing the equity of existing Federal highway user payments among the vehicle types and weight groups. Since total highway costs which are the bases of responsibilities far exceed revenues, comparison of individual user responsibilities and tax payments are shown as percentages of respective totals in the following tabulation.

Vehicle Category	Percent of Total			
	Responsibility	Federal User Tax Payment	Vehicle Registrations	Vehicle Miles of Travel
Automobiles (Including Motorcycles)	59.5	47.5	79.1	74.6
Buses (All)	0.8	0.1	0.4	0.4
Single Unit Truck (Less than 6,000 lbs)	11.4	10.3	17.5	13.2
All Other Single Unit Trucks	8.6	16.9	1.9	7.0
Truck-Tractor Combinations (All)	19.7	25.2	1.1	4.8
Total All Trucks	39.7	52.4	20.5	25.0
Total All Vehicles	100.0	100.0	100.0	100.0

Percents of national motor vehicle registrations and vehicle miles of travel (projected for the program period) are shown in the tabulation to provide for perspective comparisons of responsibilities and payments. The table possibly does some disservice to automobiles in combining them with motorcycles which pay very low Federal user taxes due to their extremely low gasoline consumption. However, without motorcycles, automobile responsibility and payment would only be revised a small amount to 58.5 percent and 47.2 percent respectively.

The results of the incremental analysis, as depicted in the table, show some inequities in current tax payments by different vehicular types based on costs which the government logically will incur in future years to provide for these types. It should be noted that the analysis does not make any retroactive determinations.

Therefore, referring entirely to the content of present and future Federal-aid programs as required to meet existing critical needs, the above table shows that passenger cars and very light trucks (pickups and panels) are generally underpaying their responsibility assessments. All other trucks are generally overpaying with other single unit trucks overpaying by the largest amount based on ratios of payments to responsibilities. Truck combinations are also substantially overpaying their equitable obligations to present and future Federal-aid programs presuming these are directed toward meeting pressing needs on the Federal-aid systems.

1.0 INTRODUCTION

The Surface Transportation Assistance Act of 1978 directed the Secretary of Transportation to conduct a Federal highway cost allocation study to include: (1) the highway costs occasioned by the use of vehicles of various size and weight characteristics; (2) the share of such costs attributable to each vehicle class; (3) the need for long-term monitoring of roadway deterioration to determine relative traffic and environmental effects; (4) recommended alternative equitable tax structures; and (5) the impact of such tax structures on affected industries and other users. The final report on this study is to be submitted to the U.S. Congress by January 15, 1982.

The last highway cost allocation study of this scope was conducted between 1956 and 1965 and also was mandated by Congress. During this same period, the American Association of State Highway Officials (AASHO) conducted the AASHO Road Test which provided pavement cost allocation criteria considered vital to a cost allocation methodology accepted by virtually all professionals as the most equitable available, namely, the incremental analysis. However, the AASHO Road Test was not completed in time for the incremental solution to be contained in the Final Highway Cost Allocation Report submitted to Congress in 1961 in accordance with its mandate. Therefore, a Supplemental Report of the Highway Cost Allocation Study was prepared in 1965 fully utilizing the results of the Road Test. The AASHTO Pavement Design Guide currently in use by a majority of the state highway agencies also emanated from the findings of the AASHO Road Test.

The incremental method is a highway engineering determination based on identifying the specific purposes for which components of modern highway systems are built and assigning cost accordingly. Initially, highways must be constructed to handle anticipated volumes of motor vehicle travel, safely and expeditiously at speeds appropriate to functional system purposes without particular regard to vehicle type. In fulfilling this requirement, they must be designed for a normal service life which means there must be adequate construction standards to withstand the deteriorating effects of weather and other environmental factors as well as generally related traffic influences.

In general, this means that there is a practical minimal highway design which is required in a particular traffic volume and functional service situation regardless of the types of vehicles on the highway. In the incremental solution, this is sometimes called the basic road.

Because of the environmental and other influences, the basic road design has features which already will accommodate not only passenger cars but also some of the characteristics of larger and heavier vehicles. For example, a minimum practical plant-mix pavement on an arterial highway already will accommodate axle loadings two or three times those of a passenger car without any more influence on the service life of the facility than if passenger cars alone were to use it.

Thus, the basic road provides basic vehicular accommodations which are, however, different for different structural and geometric elements of the highway. In the incremental analysis, the vehicular characteristics for which basic provision is made in the case of each highway element is the lowest common denominator from the standpoint of vehicular responsibilities. All vehicle types, as a minimum, are considered to have an equal share of cost responsibility for the basic road. Relative use on some reasonable measurement basis is usually the criterion for proportionately assigning its costs.

Over and above the costs of the basic road, there are highway costs attributable to the specific requirements of some vehicles presuming the maintenance of basic highway service features. For example, thicker pavement designs are required for vehicles imposing more than the axle loadings provided for in the design of the basic road. These requirements are the added increments whose costs are specifically assigned to the various vehicle groups bringing them into existence through their use of the road or, in other words, occasioning them.

Each vehicle type shares in the cost of all structural and geometric increments of highways or bridges built or maintained to provide for its size and weight requirements but not in the cost of increments which are not influenced by its size and weight requirements or use of the facilities. Engineering design principles are used to identify the incremental associations. The results of the AASHO Road Test, for example, provide a sound engineering basis for identifying pavement increments required by vehicles imposing different axle loads. Principles employed in traffic engineering and highway safety similarly may be employed to determine any incremental relationships among highway geometrics and vehicle size. Details of the incremental method are more fully described in Chapter 5.

No impartial researcher has ever disputed the soundness of the incremental theory in developing proper relationships between vehicle sizes and weights and highway design provisions on which construction costs are based. There may be dispute on relationships involving specific highway elements where engineering judgments are utilized. Influences of vehicular size and speed on some geometric features are not altogether certain. In this case, it is common to use the best consensus of unbiased engineering judgment available. But this is not the main reason critics of the incremental method are unhappy with it.

Rather, their criticism is actually criticism of the fundamental premise of the incremental theory, that vehicles should be taxed only for the costs of highway elements specifically provided for them. Instead, these critics essentially want to prorate all highway costs on the basis of comparative overall costs to provide for different vehicle types as if these individually were the only types on the road. This, they say, compensates for economies of scale inherent in the incremental approach.

The claimed economies of scale occur in the case of pavements, for example, because it takes successively smaller increments of pavement thickness to provide for incrementally heavier trucks. The heaviest truck may require only a fraction of an inch of pavement thickness over a truck 10,000 pounds lighter. This fact is not disputed. What the critics dispute is the equity of charging this truck type exclusively for its added thickness and then a proportionate cost of pavement increments beneath at the same rate as trucks requiring these increments which is the way cost assignments are made in the incremental solution. Instead, these critics of the incremental solution would have the heaviest trucks pay for all pavements at a higher overall rate to compensate for the claimed economies of scale. It is a different definition of economies of scale than economists usually employ in the market-place.

Significantly, the methods proposed in lieu of the incremental solution, which supposedly also rely on the costs-occasioned premise of tax responsibility, have no real regard for the way costs actually are influenced in pavement design, construction or maintenance. Instead, they use theoretical formula based on unreal situations. The result is almost inescapable inconsistency in the way different costs are assigned.

The critics have other problems with the incremental solution in that they wish to add costs associated with perceived economic, social and environmental impacts to charges against vehicle types, regardless of the fact that these costs are not borne by the government in providing highway services.

Unfortunately, those promoting the incorporation of social, environmental and economic factors do not indicate much concern with provable cost relationships even in the case of engineering applications. They may use formula based on general judgments and sketchy relationships which are often provably wrong from the standpoint of recognized engineering principles.

Unfortunately, such a use of generalized formulas as well as inconsistent logic has typified methodologies incorporated into the highway cost allocation study now being performed by the U.S. Department of Transportation as alternatives to the well-recognized and generally accepted engineering analysis or incremental solution.

The Federal authorities are also performing the incremental solution. They could hardly do otherwise in the face of their own extensive promotion of this method for more than 20 years. Throughout that period the Federal Highway Administration consistently proclaimed the incremental method as the most scientific cost allocation solution. However, the First and Second Progress Reports of the Highway Cost Allocation Study and financial recommendations in connection with these [1] make it clear that reliance is being placed on alternatives to the incremental solution. (See Appendix D)

Even, the most moderate of the alternative methods for which results are currently reported, from the standpoint of cost assignments to large and heavy vehicles, is based on initial guidelines from the Congressional Budget Office which are fraught with fundamental engineering errors, improper use of economics concepts, and obvious biases.

There is no way from an engineering standpoint, for example, that thicknesses or costs of highway pavements are occasioned in direct proportion to the design values called equivalent single axle loads. [2] Regardless of how pavement consumption is viewed--as using up an increment of pavement thickness provided in design or as equivalent pavement damage--direct proportioning of costs by ESALs is wrong. But this is the basis on which the CBO guidelines essentially would apportion large elements of pavement costs. Similarly, proposed bases for allocating costs of geometric elements and structures are provably wrong in numerous instances from the standpoint of engineering principles and the way costs actually are occasioned. Also, from the standpoint of economics theory, it can be shown that proportioning large elements of highway costs on the basis of inverse price elasticities does not necessarily produce optimum economic efficiency as the CBO guidelines claim.

The Secretary's Plan for the cost allocation study, as initially reported to Congress, incorporated many, if not most, of the gross technical errors of the CBO guidelines, as did later progress reports. Accordingly, two publications were developed by outside cost allocation experts to clearly point out technical inadequacies, biases and misdirections in the methods being employed by the Department of Transportation as alternatives to the incremental analysis. [1] These publications have been ignored. There has been no public response to criticisms pointing out technical error and bias.

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[1] 1981 Federal Highway Legislation, Federal Finance Options, (Discussion Paper No. 2) Federal Highway Administration, U.S. Department of Transportation, August, 1980: pps. 72-83.

[2] An equivalent single axle load (ESAL) is a mathematical value used in a pavement design formula to express the load effect of an actual axle loading in standard terms. Its only valid use, however, is in the design formula to which it specifically relates. Otherwise, it is not indicative of the relative pavement cost effect of different axle loadings.

Intention of Congress

In setting forth the requirements for the current highway cost allocation study, it is believed Congress intended employment of the best and most thoroughly supportable methodology to allocate Federal program costs among highway users strictly in accordance with the costs they occasion on Federal-aid highways and streets. This basis of taxation is thoroughly consistent with the way major highways traditionally have been financed in the United States for several decades.

In this way, costs of the highway plant furnished by the government for numerous classes of users can be apportioned among them, and possibly other direct beneficiaries, on a basis that is relevant to the demands placed on plant provisions. The earnings or benefits obtained by users are then dependent upon their abilities to pay their own way. This is in keeping with a private enterprise economy. Also, the interdependence of plant provisions, revenues and earnings, using this basis of cost allocation, can assure optional economic returns from highways.

This has been the basis for so-called good roads legislation, including constitutional amendments, which earmark highway funds and for the establishment of trust funds. While it is true that a few states have not dedicated highway user revenues traditionally, these, until recently, have generally spent amounts on highways that are equivalent to user earnings.

It is a sound basis for highway financing in that economic balance is self-generating. The alternative, which some economists espouse, relies on the judicial role of government in allocating productive resources to optimize social benefits. In the viewpoint of these economists, government should provide highway services and levy appropriate charges for highway use in such a way as to achieve specific economic and social objectives.

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[1] (1) Technical Inadequacies and Biases of the Highway Cost Allocation Study Plan, December, 1979; (2) Misdirections in the First Progress Report of the Highway Cost Allocation Study, September, 1980; CounselTrans Inc.

The problem with this alternative is the inability of legislators, economists or anyone else to accurately determine the far-reaching economic and social impacts contingent on different policies of highway development and taxation. Because of the complexities of economic and social interactions, there can be little assurance that highway policies based entirely on judgments will ultimately have beneficial effects. Instead, the results could easily be disastrous.

In times past, leading highway economists have recognized this and have concluded that the traditional financing system provides the best assurance of providing optimum productive resource allocation at least until a great deal more is known about the impacts of specific highway policy decisions.

These considerations are highly important when highway cost allocation is undertaken. Not only do they support cost-occasioning as the firmest basis for highway cost allocation but they make it mandatory that cost responsibilities be assessed in strict accordance to the way different highway users contribute to the government's incurrence of highway costs. The incremental solution is the only methodology to date that fully meets this requirement.

This is the reason the incremental analysis has been employed in this study in almost exactly the same way as it was employed in the 1956-1965 study but using brand new data on highway program needs, characteristics of vehicular use of the highways, and highway costs.

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October 14, 1982

The Honorable Steve D. Symms
Chairman
Subcommittee on Transportation
Committee on Environment and Public Works
U.S. SENATE
Senate Office Building
Washington, DC 20510

Dear Mr. Chairman:

Enclosed are my written answers to the questions transmitted in your letter of September 16, 1982. As I indicated in my testimony:

> The highway tax burden, and its specific relationship, fixed by Congress, to the highway program is of particular concern to the trucking industry. Alone, of all the transportation modes, the trucking industry pays special Federal taxes on all its fuel, lubricants, tires and tubes, equipment, both trucks and trailers, parts and accessories, plus a special weight tax on certain heavy trucks.

While all highway user groups have indicated there is inadequate funding to complete the Interstate System and to keep that system along with other Federal-aid highways and bridges in proper condition, only the trucking industry has come forward with a comprehensive program. Not only did ATA recommend a program, but also it recommended a tax structure -- based upon a proven, consistent highway cost allocation method -- which could finance its program.

With Trust Fund revenues over $10 billion for fiscal year 1985, under the industry's program, plus the current balance in the Trust Fund of $8.5 billion, we can sustain a highway program which would double 1982's authorization levels by 1986.

Respectfully,

Edward V. Kiley

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Enclosures

A National Federation Having an Affiliated Association in Each State

Question #1

> The American Trucking Associations recently commissioned two studies of pavement deterioration. Both these studies assert that environment, not use, is the major cause of pavement deterioration. The American Association of State Highway and Transportation Officials reviewed the studies and found that: (1) they appear to ignore the many studies that did show a strong correlation between axle applications and pavement deterioration; and (2) they fail to point out that loads and environmental factors interact, one reinforcing the other, to cause pavement damage. Don't these two points indicate that some damage-related approach, rather than the incremental approach, is required to allocate pavement rehabilitation costs?

Answer

This question fails to recognize the fundamental differences between an "incremental pavement cost assignment" and a relative consumption or "damage-related" approach.

The incremental approach charges for the "differential damage" associated with different axle loads in advance, through the process of assigning the extra costs needed to accomodate heavy axle loads when the pavements are built. It is the differences in the costs of different pavement thickness which are assigned to the different axle weight increments. The condition of equity is that each pavement increment is designed to wear out at the same time, and require rehabilitation at the same time.

The "consumption" approach is entirely different, however, in that any "relative damage" based assessment must be related to only one specific pavement, since all theory would indicate that the rate of deterioration is some inverse function of pavement strength, for any given amount of traffic. Thus, the consumption approach becomes viable only if there has been no prior assignment

Question #1's Answer (Cont'd.)

of cost responsibility for differential use. This means that new construction costs must be considered as "common costs" shared equally by all vehicles, and not differentially assigned.

The Section 210 report of the 1965 cost allocation study addressed this very issue in its discussion of maintenance cost assignments. It states that the point at issue "was whether the operation of heavy vehicles on highways properly designed for them introduced increments of maintenance costs that would not be incurred if highways were designed for and used by light vehicles only..." The discussion further stated that while it might be appropriate to compute the relative cost associated with the differential use of a given highway pavement, if only maintenance were being considered, "...it is not defensible if responsibility for construction expenditures is also allocated incrementally."

Since "maintenance" and "rehabilitation" obviously result from the same physical forces and since the incremental approach accounts for all the physical effects for each axle weight increment, the discussion about various actual causes of pavement distresses does not invalidate the incremental approach for the assignment of rehabilitation costs. In fact, the use of the incremental approach for the assignment of new pavement cost carries with it the requirement that the same concept be used for the assignment of rehabilitation costs. To change approaches, as is done in the Federal study, results in charging the industry twice for the differential use of the pavement, both in the past assignments and in the current ones.

Question #1's Answer (Cont'd.)

With specific reference to the AASHTO statement, review of the individual state responsible to the AASHTO survey shows that not every state concurs entirely with the conclusion cited. Nor did AASHTO present specific findings of other studies to support their overall criticism of the Texas Transportation Institute (TTI) and CounselTrans study.

(1) The technical literature is comprised of literally hundreds if not thousands of reports which have been directed in one way or another to the question of the relation between axle applications (or loadings) to pavement deterioration. Some of these reports, perhaps most of them, indicate that accumulated traffic is correlated in a statistical way with specific pavement deterioration. On the other hand, there is also a large body of evidence in the same technical literature which will demonstrate that many specific highway pavements have carried huge amounts of accumulated traffic loadings, have not deteriorated, and have served far beyond what the theory predicts in their capability.

The TTI study is drawn from a huge data base which their pavement research group has collected over the years, and which represents pavements which have both failed and not failed. Thus, it rests on a very broad base which includes all types of pavement performance, not just pavement failure, such as is represented by the AASHO Road Test. The problem is to be able to define all the actual "causes and effects" which control pavement performance, and not just assign the total responsibility to traffic loadings, as the AASHO Road Test relationships do.

(2) The AASHTO review of the TTI is in error when they conclude that the interaction of loading and environmental forces was not included in the assessments. The Study was specifically designed to include this interaction by separating the pavement distress classifications into the following 3 groups:

Load alone
Environmental along
Load and environment combined

Question #1's Answer (Cont'd.)

> The tables on pages 9, 10, and 11 of the TTI report identify the classification of distresses for Jointed Reinforced Concrete Pavement and for Flexible pavement. A review of these tables reveals that the "combined" distress classifications are far more numerous than either "load" or "climate" individually. The conclusions presented by ATA relative to the effect of traffic were those obtained by adding the "load alone" and "combined" results from the analysis.

The "CounselTrans" report also noted the interaction of the two basic causes: the influence of load in accelerating environmental distresses and vice versa. But there was no apparent way of determining the degree of this interaction. So, the objective was confined to identification of first cause.

Despite AASHTO criticisms of the CounselTrans work, photographs are available every 150 feet of the sample mileage to illustrate what was summarized -- that distresses initially related to non-load causes exceed in relative severity and extensiveness those initially related to load causes. For example, joint failures are the most common problem on portland cement concrete pavements. These are primarily caused by (1) thermal expansion of concrete slabs and (2) freeze-thaw expansive aggregate pressures. There is no other logical explanation.

Question #2

> In its review of the two above studies, AASHTO states that "it is the opinion of AASHTO that the conclusions of the two consulting reports that are not valid." You have been critical of the CBO and DOT cost assignment methods. How do you respond to the AASHTO criticism of the ATA-sponsored studies?

Answer

ATA obviously disagrees with the opinion expressed by AASHTO that the conclusions of the reports are not valid, as they were accomplised by reputable and competent consultants, independently, and totally without any input by the industry, beyond trying to define our concerns.

The industry-sponsored work represents the most comprehensive analyses published up to this time. It is clear that the relative axle load effects are continuously variable over both pavement condition and strength parameters, yet the CBO/DOT methodology assumes that they are constant and factually developed by the AASHO Road Test. We find it hard to conceive that such major assumptions are accepted as direct allocators of relative cost responsibility, when there is no proof of their validity.

ATA has been careful to clearly identify those conclusions we have drawn from the reports, as the subject is highly complex and controversial. We have been critical of the CBO and DOT cost assignment methods from the technical point of view, because they are based on major and dominating assumptions about the relative effects of traffic, environment, and time on pavement performance, while the truth about these relative effects is not known and may never be satisfactorily defined.

Question #2's Answer (Cont'd.)

To some extent, the AASHTO letter asking for a review of the Texas Transportation Institute and CounselTrans studies is clearly designed to seek an adverse response, and some of the responses reflect a pre-determined position. On the other hand, there are several significant comments in individual state responses which are not reflected at all in the general overall opinion cited above. We also note that the states responding had a limited amount of time to make their review.

Question #3

> The 1962 AASHO Road Test found that a fully-loaded tractor-trailer/semi combination does the same amount of pavement damage as it takes 9,600 cars to cause. The recent DOT cost allocation study uses a ratio of approximately 1 to 18. Do you believe this is a conservative estimate?

Answer

There is no conclusion in the AASHO Road Test pavement research report that "...a fully loaded tractor-trailer/semi does the same amount of pavement damage as it takes 9,600 cars to cause." This allegation comes from a mis-interpretation or distortion of the findings of the AASHO Road Test and is contrary to the stated "objectivity of findings" contained in the report on page 3.

> ...Although estimates were obtained for the effects of axle load and axle configuration, it was not possible to determine the statistical significance of these effects because replication of load or configuration wasnot provided.

In addition, there are many other deficiencies in this type of "conclusion." There is no constant relationship between the probable effects of different axle weights when pavement of different types, strength, and condition are considered. Such a ration is meaningless if a pavement is strong enough so that a passenger car does not damage it -- 9,600 times zero is still zero.

Beyond the deficiencies in drawing direct conclusions from these ratios is the implication in the question that these ratios somehow have a direct relation to the relative cost responsibilit which different vehicles should bear. The ratio does not have an relevance with respect to the approximately 1 to 18 ratio cited. In the same context, the incremental study presented in the DOT report found that the heaviest combination vehicle had 8 times the cost responsibility that the automobile did, and that it would meet its responsibility under the current tax structure.

It should be remembered that these "ratios" are dimensionless numbers which have no merit as "direct measures" of anything. The axle load equivalency factors are not a "common denominator" calculation, but reflect a calculation in which the numerator of the fraction is held constant. Thus, there is no valid mathematical basis for comparing one ratio to another, as is done in the opening statement.

The answer to the question, therefore, is that the DOT approach is not a conservative procedure. The mathematics simply do not establish that the first "ratio" can be validly compared to the second. Overall, the DOT procedure greatly overstates the heavy combination cost responsibility and significantly understates the automobile cost responsibility.

Question #4

> Since AASHO load effect relationships are widely used in pavement design and form the basis of the "AASHTO Interim Guides for the Design of Pavement Structures." Why do you call their use in the DOT study, a "new, untested philosophy?"

Answer

ATA recognizes the desirability of having a uniform means of considering the expected traffic demand for entry into any pavement design procedure. As such, the equivalency concept provides a convenient way of applying the AASHO Road Test to pavement design procedures, for the loading component of pavement design. We accept the use of the Road Test equations in design and in the incremental cost allocation procedures. Because the equivalencies are only a part of the total design process, they cannot be used as the fundamental measure of relative cost responsibility. To do so constitutes a gross misuse of the AASHO equivalency concept.

Pavement design involves many other "design parameters" in addition to the expected traffic. The AASHTO Interim Guide, for instance, may involve as many as six additional parameters in the design of flexible pavements. Any or all of these parameters in the Guide may be changed by the designing agency as they see fit in their effort to update their design procedures.

The acceptable use of the load effect relationships in design, however, does not validate the load relationships as the true "cause and effect" measure of pavement deterioration. Just as there are many factors which influence pavement design, there are many factors which influence pavement performance.

Question #4's Answer (Cont'd.)

The philosophy used in the DOT study was first advanced in the U.S. in a study contractd by the Association of American Railroads and later promoted by the CBO. A reading of the current DOT report reveals that it is still untested and that a great deal of research is underway in an attempt to define some of the critical elements. Realistically speaking, a pavement consumption based approach to high way cost allocation cannot be justified until the long sought, and still elusive, rational pavement design is available. All relative effects that traffic, environment, and chemicals have on pavements of all strengths and compositions must be known. A part of the rational pavement design procedure will logically involve a complete reassessment of the AASHO Road Test, so that its analysis will be made on the same advanced technical methods used in the new pavement design procedures. The DOT approach is a "new, untested philosophy" because it is characterized by major unknowns which are recognized but ignored by the major assumptions of the report.

Question #5

> In testimony last month, CBO stated that the DOT study "represents a significant improvement over previous studies of this sort, chiefly because it has replaced the incremental method of cost allocation with a consumption-based method." Why do you favor use of the incremental method, which both CBO and DOT reject?

Answer

ATA continues to support the incremental approach to highway cost allocation, as did DOT prior to the current study, because it is based on clear, definable, and measurable standards. Equity is defined as the provision of equal service, equal safety, and equal pavement life to each class or user. Equity is measured by standard physical parameters associated with building highways. Each of these parameters is quantified by "standard units of measure" kept by the U.S. Bureau of Standards.

In contrast, DOT's consumption philosophy is totally dependent on the "relative effect" factors used in the implementation. These factors are not measureable quantities. Rather, they are dimensionless "ratios". It is not possible to go to the Bureau of Standards and find a "standard unit of measure" for "pavement damage", "present serviceability index", or "equivalent single axle load". Yet cost responsibility in the consumption approach is totally dependent on the value "assumed" for this array of dimensionless, unmeasurable ratios.

In a broader sense, ATA criticizes the DOT procedure as it follows no single philosophy, but picks and chooses the method to use for different cost elements. This fact, by itself, results in charging for the different use made of highway pavements twice --

Question #5's Answer (Cont'd.)

once in construction and once in proportion to relative use of a given pavement. Further, the presently available "relative use" measures, particularly those applied to pavements, are irrational, subject to monumental uncertainty, and continuously variable over both pavement condition and pavement strengths. They need major reassessment and development on a rational basis before they can be considered valid for such an important use. Finally, the consumption approach requires that the relative effects of all forces on pavement deterioration be validly established. This requirement is not met, but it is clear that the current DOT methodology has virtually ignored the strong, independent effect of weather on pavement deterioration which industry-sponsored research has identified.

In summary, ATA rejects the criticism of the incremental approach. In fact, our extensive analysis convinces us of the fundamental strength of the incremental philosophy, and of the fundamental flaws of the consumption approach. It is our position that highway cost allocation must be based on definable, standard, measurable quantities which are uniformly and equitably related to all classes of users. The consumption approach fails this criteria in virtually every instance.

Question #6

CBO commented further on the incremental method, saying:

> The situation is analogous to a 1-cent sale on aspirin in which after paying the full price for the first bottle, a second may be purchased for only 1 cent more. Rather than allocating costs based on the number of "aspirin" each user consumes, the incremental approach effectively assigns the cost of the first, full-price bottle to cars and that of the second, reduced-price bottle to trucks. While the distortion caused by the incremental method is not as large as this, trucks nonetheless receive preferential treatment under this approach.

Please comment on the CBO analogy.

Answer

The CBO analogy relative to the aspirins is not a good one for at least three reasons. First, the pricing of highway provisions or services is not a germaine consideration under the cost-occasioned principle which Congress directed the Highway Cost Allocation Study (HCAS) to employ. The only germaine consideration is what it cost the government to provide for the different characteristics of different vehicles and their use of highway facilities. In the incremental analysis, passenger cars and all trucks are charged entirely on the same basis for the first increment they all require. In fact, passenger cars enjoy an economy of scale because there are more vehicles to share the cost of this increment. Subsequent increments cause the government to incur additional occasioned costs. These increments are not needed by passenger cars and they are not expected to pay for any part of them. In most cases -- pavements, bridges, roadway width, climbing lanes, grading and drainage quantities, etc. -- unit

Question #6's Answer (Cont'd.)

costs of the materials and work to make the additional provisions are less. So what? So long as the additional vehicles are paying the additional costs, exactly and entirely, the cost occasioning principle is fulfilled. In fact, if the unit costs for this extra provisions were increased, as they would be if the price advantage were also distributed to passenger cars, the cost-occasioning principle would be violated because the heavier vehicles would be required to pay more than the additional amount it actually cost to provide them.

In addition, it is an incorrect presumption that the incremental solution does not allocate pavement costs on the basis of what each user requires. All users together need the passenger car pavement provided for them and so they are charged. The presumption that trucks need more pavement than the designers provided for them does not put designers in a very good light. On the other hand, it can be shown that the HCAS consumption method does not allocate pavement costs on the basis of what each user requires. Instead, it misuses a design factor known as equivalent single axle loads to which costs relate logarithmicly, not directly.

Finally, the incremental method allocates the costs of first, full-price bottle to all highway users on the basis of vehicle miles. The heaviest vehicles, which comprise 1.1 percent vehicles, are assigned 5.5 percent of costs, based upon vehicle miles, or aproximately $400 million in 1979. The so-called "second reduced-price bottle" is assigned fully to heavy trucks at a cost of

Question #6's Answer (Cont'd.)

$1.4 billion, not 1 cent. As a result, heavy trucks paid $1.8 billion, or 25.1 percent of the highway user fees in 1979. In other words, the price paid for the so-called "second, reduced-price bottle" is actually 350 percent greater than the price paid for the first bottle. Trucks do not receive preferential treatment under this approach.

Question #7

> Is there anything about the incremental approach, besides the fact that it has been used before, that makes it preferable to the approach advocated by DOT? How is the incremental approach technically sound for allocating pavement 4-R costs?

Answer

To date, the incremental analysis is the only method yet proposed for the allocation of highway costs, based on the way they are occasioned by different classes of motor vehicles, that is logically reasonable, scientifically tenable and completely objective. Virtually all of the charges that have been levelled against it either involve misrepresentation of its principles, procedures and results or deal with issues that are not actually germaine under the cost-occasioning principle.

For example, in the case of pavement design, the only economies of scale are those related to the added highway requirements necessary to provide for added vehicle size and weight characteristics. It is not a case of providing to trucks the elements of structure they share with passenger cars at less cost. This does not happen in the incremental analysis. For elements they share together, the trucks are charged with proportionate cost responsibility on exactly the same basis as passenger cars. And, similarly, heavy trucks are charged on the same basis as light trucks for the elements they share. It is only because added costs related to the added or incremental features of trucks cost less on a unit basis that any economies of scale are involved. But these are economies of scale enjoyed by the government in providing the added requirements. These costs are added to the mutually incurred costs to determine the responsibility of the vehicles with the added features. And these are the only costs actually incurred to provide for these features. In other words, they are the only acdditional costs occasioned by the vehicles possessing these features. And this is what the cost occasioning principle calls for: assigning the actual costs incurred to provide for the requirements of different vehicle classes only to those classes.

From this, it should be apparent that any economies of scale in the process are completely immaterial and irrelevant from the standpoint of cost occasioning.

The incremental theory does provide for pavement rehabilitation costs, despite the statement on page I-4 in the Final Report of the Highway Cost Allocation Study. It is simply a matter of logic. If pavements provided in design depreciate over time exactly the way the designers intended as a result of vehicular use in a practical environment, it can only be inferred that each vehicle class has played its allotted pre-determined role in such depreciation. And AASHTO officials have stated, for the record, that pavements have performed pretty much as expected. Since vehicles have played their relative roles to create the depreciated situation in accordance with design, what more logical way is there to allocate the refurbishment costs than on the basis of the same design theory? This simply starts a new

Question #7's Answer (Cont'd.)

cycle. And that is exactly what the incremental analysis does with 4-R costs.

The only reason the 15-step procedure, represented in the Highway Cost Allocation Study as an improved approach, achieves any significantly different result than the 6-step approach of the 1965 Section 210 study is because it eliminates the basic pavement which is a cornerstone of the traditional incremental method. The Final Report, especially on page IV-47, makes it appear that the 15-step approach is better for different reasons.

Question #8

> In addition to the U.S. DOT, a number of States and foreign countries have, over the last several years, used the consumption approach to pavement damage. Why do you believe they have done so, and why do you call the consumption approach a "new, untested philosophy"?

Answer

The salient question should not be how many government agencies, foreign or domestic, have used the incorrect consumption aproached utilized in the Highway Cost Allocation Study (HCAS). Instead, the question should be whether or not the approach is technically supportable and equitable.

The so-called "consumption" approach to pavement damage is a new, untested philosophy because it is based on a misuse of the AASHO Road Test results, as we indicated in our testimony. This misuse of the AASHO Road Test Formula seems to have originated in a study prepared in West Germany for the government-owned German railway system. Similar studies were then conducted in other European nations where government-owned railways were experiencing huge deficits. At the time of these studies in Europe, officials of the Federal Highway Administration were quoted as rejecting this use of the AASHO Road Test Formula as "improper use, serious mutilation of the results, certainly wrong."

The first study in the United States based on this "consumption" theory of pavement cost allocation was conducted by the Urban Institute under a contract for the Association of American Railroads. That study had little impact in the United States until the methodology was recommended by the Congressional Budget Office in 1978 and accepted by the Department of Transportation as

Question #8's Answer (Cont'd.)

the basis for a new highway cost allocation study. Throughout the period when the "consumption" theory was being advocated by railroads in Europe and in the United States no evidence was ever presented to show that the AASHO Road Test Formula properly measures pavement consumption or pavement damage caused by various vehicle classes.

No state highway cost allocation studies using this methodology were made prior to the adoption of the "consumption" approach by the Congressional Budget Office and DOT. Subsequent state cost allocation studies based on various modifications of the "consumption" theory have simply been based on the assumption that since DOT is using the theory, the states should do likewise. Up to the present time, despite the extensive promotion of the theory by the railroads in the United States and Europe and now by the Department of Transportation, there has still been no evidence presented to show that the equivalent single axle load concept properly measures the actual pavement consumption by various classes of vehicles. This remains simply an assumption of the proponents of this methodology despite the fact that the AASHO report itself and previous DOT officials have rejected the assumption.

Question #9

Do you believe that the incremental method as used in the Federal study submitted to Congress in the 1960's adequately treated pavement rehabilitation costs? Is it based on how pavement 3-R costs are occasioned?

Answer

We are convinced that the fundamental concept of treating 3-R costs by the incremental methodology not only treats them adequately, but that it is a required methodology when new construction costs have been assigned incrementally. DOT made the same statement in the 1965 report. To switch philosophies, as is advanced by the current DOT study, results in charging for differential use twice.

The incremental assignment of 3-R costs is definitely based on "how" the 3-R costs are occasioned in proportion to how design formulas influence 3-R costs. The DOT philosophy is not based on "how" 3-R costs are occasioned but on their opinion of "why" they are occasioned, which is an entirely different matter.

Question #10

> Both DOT's recommended cost allocation approach as well as the incremental method show that the lighter trucks have been subsidizing heavy combination trucks. Do you believe there should be a redistribution of tax responsibility among truck classes or should this subsidization continue?

Answer

The statement on which the question is premised is an inaccurate statement and, thus, the question is inappropriate. The incremental study contained in the Final Report on the Federal Highway Cost Allocation Study found that all trucks are subsidizing passenger vehicles and not that lighter trucks are subsidizing combination trucks. This finding is confirmed by the incremental study conducted for ATA and MVMA by CounselTrans, Incorporated completely independently of the DOT study. Since under the incremental method all truck classes are substantially overpaying their cost responsibility, there is absolutely no need for a redistribution of tax responsibility among truck classes based on the incremental findings. There is, in fact, no subsidy.

Question #11

> Mr. Kiley stated at the August 10, 1982 hearing that DOT had "queer figures" on light trucks and that the Federal data are questionable. How would you differ with the procedures used by DOT to estimate truck population?

Answer

The Highway Cost Allocation Study traffic estimates for the 1977 base year differ substantially from those given in the FHWA annual Highway Statistics reports, heretofore accepted as the most authoritative source of these kinds of data since the nineteen thirties. This does not represent only a conflict in one year's data but also a conflict with all of the trend data of prior years, as reported in this source. And this is not the only conflict between HCAS data and source data previously accepted as the best available. The HCAS estimates of proportionate travel by different truck classes cannot be made to correlate with annual motor vehicle classification counts and truck weight study data compiled by the FHWA and the states.

The most significant problem is in the estimation of combination truck mileage where estimates are too low for light combinations and too high for heavy combinations, the result tending to substantially multiply the responsibilities of heavy trucks. Because of the low light combination truck figures, all combination mileage is underestimated, according to Highway Statistics, and the difference appears to be picked up in estimates for pickups and vans which do not agree with on the road classification count data.

The HCAS traffic projections are equally difficult to understand and tend to compound the bias against heavy vehicles.

Question #12

> Cars are becoming smaller and lighter while trucks are becoming larger and heavier. Also the percentage of cars in the vehicle traffic stream is declining while the percentage of combination trucks increases. Why then shouldn't the heavier vehicles assume a larger share of the Federal road-use taxes?

Answer

Heavier trucks have assumed a larger share of the Federal road-user taxes. According to the Highway Cost Allocation Study, (HCAS), Table I-6, combination trucks paid 16.3 percent of all Federal highway user taxes in 1977. If the tax structure is not changed, HCAS estimates combination trucks will be paying 26.5 percent in 1985. During the same time frame, passenger cars share of highway user taxes will drop from 55.6 percent to 38.7 percent. Not only will the percentage share increase for trucks, but also the total amount paid will increase, without a change in the tax structure. The HCAS estimates, Table I-5, that for all combination trucks, the average tax per vehicle of $1,057 in 1977 will increase 33 percent to $1,411 by 1985. HCAS estimates that the average tax per passenger car will drop 32 percent, from $37 in 1977 to $25 in 1985.

Finally, while the percentage of cars in the traffic stream has been declining, the share of combination trucks has not increased. According to FHWA's Highway Statistics, Table VM-1, the percentage of passenger cars has dropped from 80.3 percent in 1970 to 75.3 percent in 1980. During the same time frame, the percentage of combination trucks has remained constant at 0.9 percent. Single unit trucks increased their traffic share from 16.0 percent of all vehicles in 1970 to 19.9 percent in 1980.

Question #13

> Most of the objections to the Federal cost allocation study heard in our recent hearings have come from the trucking industry. To your knowledge, are there other major groups critical of the study?

Answer

Objections to the Federal cost allocation study have come mostly from the trucking industry because it is the industry penalized by the DOT's consumption theory of cost allocation. DOT admits that "information collected by the states over the years is not fully adequate to develop comprehensive pavement damage functions." Yet DOT proposes to radically increase the amount of taxes paid by heavy trucks, such as a typical 5-axle tractor semitrailer by as much as 175 percent, before the final numbers are in. Should its theory be proven false -- and we believe it will -- it is the trucking industry, and no other industry, which will have paid for DOT's mistake. ATA's opposition to the DOT's methodology is also supported by the Motor Vehicle Manufacturers Association.

Perhaps, it is more illuminating to review the groups which support DOT's new approach. Outside of DOT, the only Federal agency supporting the new methodology is the Congressional Budget Office (CBO) which originated the methodology. It's inconceivable that CBO would testify against its own guidelines 3 years later. The only other groups giving full support are the Association of American Railroads and the American Automobile Association. The AAR's historical opposition to improved highways, its support for increased truck taxes, and its fight against increased truck sizes

Question #13's Answer (Cont'd.)

and weights, i.e., improved productivity, is well-known and need not be repeated. Suffice it to say, the one group of trucks which will pay the largest increase in highway user fees are those trucks over 70,000 pounds gross vehicle weight which the railroads contend are competitors.

The position of the AAA is puzzling. In order to support an increased Federal highway program, passenger automobiles will have to pay more. Under the ATA program, the average medium passenger car which presently pays $34.04 will pay $45.95, while under the DOT proposal (2B), it will pay $50.31.

Question #14

> Highway engineers and pavement experts often point to the interactive effect between loads and environmental factors. Has this interactive effect been analyzed by the trucking industry?

Answer

The only pavement deterioration study is the trucking industry's analysis by the Texas Transportation Institute under sponsorship of ATA and the Motor Vehicle Manufacturers Associations. This analysis specifically considered pavement distresses that were classified as being caused by:

Load alone
Environment alone
Load and Environment combined

The conclusions drawn by ATA from this study were the proportion of total distresses associated with subtracting the sum of the "load alone" and "combined" categories from "one". Based on this analysis, we stated that environment acting alone accounted for more than half the total distresses.

The issue is not whether there is a "load effect" of some magnitude, but whether there is a significant independent environmental effect at all. While the TTI report identifies the independent causes as very strong, the DOT pavement rehabilitation assignment procedures virtually ignore environment as an independent cause. DOT's procedures consider it significant only as it interacts with loading. This has led to the ATA statement that the DOT study neglected environmental causes of pavement deterioration, thus, greatly overstating the truck responsibility.

Question #14's Answer (Cont'd.)

The issue of the independent and interacting effects of loading and environmental forces is complex, and is influenced by many factors. The AASHO Road Test did not reflect, however, the independent effect of environment, as that was intentionally excluded from the experiment. This is one of the reasons that the AASHTO Road Test was not representative of pavements in normal service.

Question #15

> Does the DOT's use of vehicle miles of travel rather than axle miles to allocate basic pavement thickness result in a lower or higher cost assignment to heavy vehicles?

Answer

We interpret the question to relate to pavements where the "residual costs" were allocated by the VMT parameter. Obviously, the allocator used to assign any highway cost element will influence the proportion of cost distributed to any vehicle class. Thus, if axle miles were used to allocate basic pavement costs (residual costs), instead of vehicle miles, then a higher proportion of the costs would be assigned to combination vehicles.

It should be explained, however, that the allocator used to assign any cost must logically be consistent with the philosophy being employed. Thus, under the consumption philosophy, the definition of residual costs pretty well limits the allocator which is appropriate.

Residual costs which are applicable only to the consumption approach are defined on page IV-53 of the final DOT Report as: "Residual costs are those highway costs that are not clearly caused by the dimensions, weight, or use of particular vehicle classes." (underlining added).

Under the definition, "registration" is the logical allocator, rather than vehicle miles of travel (VMT), since registration is the only vehicle parameter which does not reflect "use". In any case, there is no justification to go to any higher order "use" parameter than VMT for the allocation of "residual costs."

Question #16

> Would heavy trucks be assigned a greater cost if bridge repair costs were treated as residual rather than directly attributable costs? Does the new DOT study assign more bridge repair costs to heavy vehicles than the 1965 DOT study?

Answer

Comparison of Tables D-9 and D-10 in the Final Report of the Highway Cost Allocation Study (HCAS) provides the answer to this question. However, while the new HCAS methodology does not assign bridge repair costs incrementally, the specific treatment is not of nearly as much significance as (1) the unsupported assumption that large vehicles have substantial effect on bridge width requirements in the new bridge assignments; and (2) the unsupported assumptions relative to bridge replacements coupled with the complete lack of direct cost relevance in the measurement system utilized to allocate bridge replacement costs which is designed simply to penalize heavy vehicles. There is no direct cost relevance in the bridge sufficiency rating system. And bridges which cannot support current legal vehicle loads are most likely to be old and generally deteriorated as well as functionally obsolescent, requiring replacement anyway. To put a premium charge on heavy vehicles, on top of their reegular incremental assignments already increased by unsupported width assumptions, obviously produces a heavy bias in assignments to these vehicles. Thus, a comparison between the 1965 (Section 210) study and the current study, in the way repair costs were handled, is of little significance as a criterion of equity. So far as can be determined without in-depth analysis, the 1965 study did lump bridge repair

Question #16's Answer (Cont'd.)

costs (to the extent these involved reconstruction and Federal expenditure) together with all other program costs to treat them incrementally or, in the new study terms, as attributable costs. Partially, this was consistent with the traditional incremental concept that replacement costs restored something originally provided, which deteriorated through originally contemplated use, and, therefore, should be treated in the same way as original costs. This concept applied to all roadway elements subject to deterioration over time including bridges, pavements, shoulder surfaces, etc. Partially, however, the Section 210 study made it clear that refined program information, necessary for more refinement in the cost assignment process, was simply not available. It still is not.

Question #17

As a part of the Section 506 study the Federal Highway Administration established a pavement long-term monitoring process. Do you agree with FHWA's approach on LTM?

Answer

The worth of any program of long-term monitoring of pavement costs is dependent on the content of the program. Certainly, far too little is known about the behavior of pavements over time as related to original design, construction procedures, materials, drainage, climate, traffic, loading and other variable conditions. Certainly, this behavior and the costs relevant to it need to be monitored. It is too bad a suitable formal process was not undertaken by the FHWA and states at the time of construction of the Interstate System. As it is, a large number of states do not even have detailed original design information in any easily retrievable form. Virtually none have relevant maintenance information.

To the extent the process undertaken at this time monitors, through regularly scheduled field surveys, the specific kinds of distresses that occur on different pavement sections, obtains and maintains all relevant information on the possible contributing factors indicated above, and results in on-going analysis to determine factual relationships, it could be extremely valuable not only in future cost allocation studies but also in pavement design and maintenance management. To the extent field processes are limited to regular deflection or dynaflect measurements and relevant associated information is maintained, the monitoring will

Question #17's Answer (Cont'd.)

undoubtedly be valuable but much less so. To the extent it is exclusively oriented toward on-going determination of the value know as present serviceability index (PSI) or its correlative present serviceability rating (PSR), it will have little value in determining actually what is going on from the standpoint of cost allocation.

ATA believes that the results of a proper long-term pavement performance monitoring program must be at hand before an equitable "consumption" cost allocation procedure can be established. This is apparent because the consumption approach requires that all of the forces which impact highway pavement performance in the real world must be known before it is defensible. ATA notes that the incremental cost approach does not require this unavailable data and knowledge for a reasonable and fair cost allocation, and that the results of an incremental pavement analysis would probably not be significantly impacted by a much refined, rational pavement design procedure.

ATA recognizes that long-term pavement monitoring can be beneficial, provided the proper elements are entered into the effect. We also believe that the program should be supplemented by a "reassessment" of the basic data from the AASTO Road Test using the latest technical methods, so that the monitoring data, road test data, and laboratory data will all be contained in the same technical framework.

Question #18

Do you believe all trucks should pay the same rate of excise tax regardless of how many miles they are driven per year, or should miles driven be reflected in all the tax rates rather than just in fuel taxes?

Answer

The number of miles driven is reflected in more than just the fuel tax. Other taxes which reflect mileage include the taxes on tires, tubes, retreads, and lubricating oil. In 1979, these taxes, plus the fuel tax, accounted for 48 percent of the taxes collected from heavy trucks. The excise tax accounted for 37 percent of the tax collections from heavy trucks and is amortized over the life of the vehicle. Since most carriers trade in vehicles after so many miles have been accumulated, the excise tax, in effect, is indirectly related to mileage. Only the heavy use tax is independent of use, although the tax can be paid on a quarterly basis and need not be paid if a vehicle is not used in one quarter.

At first glance it seems that collecting total user fees on a per-mile basis would be preferable to a mixture of taxes that directly reflect use as opposed to taxes that do not. However, the basic "two-structure tax system", i.e, is a mix of taxes independent of use and those directly related to use, has proven more beneficial at both the Federal and state level since highway needs do not always reflect the actual use being made. Many highway needs reflect the need for highway expenditures to overcome the inevitable effects of age, weather and the environment so that to peg every tax collection to direct use might result in inadequate funding for total highway needs.

Question #19

> Several states have a weight-distance tax and maintain tha they are able to administer and enforce it successfully. Proponents say the tax is a good way to track the damage responsibility of heavy trucks. In the interest of equity, shouldn't a Federal weight-distance tax be considered, along with an increase in the fuel tax?

Answer

Weight-distance, ton-mile or mileage taxes as they are practically applied in the United States are, in fact, among the most inequitable tax methods used by the states. As practically applied, such taxes are based on the maximum registered weight of the vehicle times miles operated, whether those miles are empty, partly loaded or fully loaded. If the pavement consumption theory or the damage responsibility theory has any validity, then it is clearly inequitable to charge a petroleum transporter as though the vehicle were loaded 100 percent of the time when in actual practice, it is fully loaded barely 50 percent of the time. In contrast, a hauler of building materials may very well haul metal products on the return and be fulled loaded nearly 100 percent of the time. To charge both as though they are fully loaded at all times introduces major inequity.

Secondly, weight-distance taxes are inequitable because they are self-reporting taxes. The history of taxes not only in the United States but in the rest of the world as well, clearly indicates that self-reporting taxes become subject to greater and greater evasion as the years go on. Verification of ton-mile or weight-distance taxes due can always be achieved only through audit of the records of a motor carrier. Such audits are expensive,

Question #19's Answer (Cont'd.)

and it is almost 100 percent certain that the records of fully-regulated for-hire will be subject to closer scrutiny than non-regulated carriers.

Thirdly, weight-distance or ton-mile taxes are discriminatory because the costs of collection of such taxes are invariably far higher, both for the state and for the carrier, than for any other highway user taxes. The administration of fuel taxes typically costs the states less than 1 percent of the taxes collected. In contrast, those states which enforce ton-mile taxes are spending at least 20 percent of total receipts on the administration and collection of the tax. This is a needless waste of tax revenues. In addition, the cost of collection of the necessary data for motor carriers can be astronomical when the carriers travel only a few miles into a state and the vehicle must stop for inspection for lengthy periods at the port of entry or other border check point.

Finally, ton-mile taxes are inequitable because invariably neighbors of the ton-mile tax state tend to retaliate against vehicles coming from such a state by imposing special taxes on those vehicles. Or, on the other hand, in order to protect industries based in the ton-mile tax state, exemptions are written into the weight-distance tax law which relieve major industries of the responsibility of paying the tax and hence, introduce greater inequities into the tax structure. For all of these reasons, there is no practical evidence that weight-distance taxes provide any greater equity than does the two-structure registration fee and fuel tax combination of payment of highway user taxes.

Question #20

> Some of the States presently impose a differential gasoline and diesel fuel tax. The DOT study suggests that consideration be given to such a fuel differential at the Federal level. Since diesel-powered vehicles have greater fuel efficiency and do not contribute as much revenue per mile of travel as gasoline-powered vehicles, why wouldn't this be a fairer way to tax?

Answer

Currently, only nine states have opted for a so-called "diesel differential". All imposed their "diesel differential" prior to the energy crisis of 1973. No new state has imposed the "differential" since 1973; thus avoiding penalizing the more fuel-efficient vehicle.

Moreover, a diesel-powered vehicle does pay higher user fees. This is because a diesel-powered vehicle costs more than a gasoline-powered vehicle. For a typical tractor with a 203-210 horsepower engine, the difference in price is $7,600. With the current 10 percent excise tax amortized over the 8-year life of the vehicle, the diesel-powered vehicle will pay $95 per year more in excise tax than a comparable gasoline-powered vehicle. However, the diesel-powered tractor will use 1,139 fewer gallons and pay $46 less in fuel tax. In terms of total taxes, the diesel-powered vehicle will pay more in taxes than a similar gasoline-powered vehicle.

In summary, although the diesel-powered vehicle is more fuel efficient, it pays more road use taxes. The DOT suggestion that a diesel fuel differential should be as much as 30 percent ignores the excise taxes paid, as well as the total taxes paid, while singling out only the difference in fuel efficiency.

Question #21

> DOT has suggested that the present annual heavy vehicle use tax be graduated as a function of weight rather than remaining constant and in addition that the tax be assessed directly on vehicles' registered gross weight. Wouldn't these changes more fairly assign cost responsibility?

Answer

Fundamentally, a tax schedule which places major reliance on graduated gross vehicle weight parameters is wrong in the present situation because it is contrary to the way highway costs are occasioned. Historically, the strategy for the regulation of vehicle weights in the United States has been that of "spreading the load". Even though there has been a trend for allowing increases in gross weights, it has generally been through the requirement that vehicle type be changed, i.e, by spreading the load over more axles, rather than by allowing increased maximum axle loadings. This strategy has come full force in the current Federal gross weight formula, which formally puts it in the gross weight regulation law.

The consequence of the strategy is that increases in gross vehicle weight limits are not accompanied by commensurate increases in the demand placed on highway pavements and bridges. In fact, the present formula permits increases in gross vehicle weights without really changing the demand on highway structures at all. Since the graduated gross weight taxation philosophy is totally contrary to the benefits obtained from the gross weight formula, it is not a valid form for recovering the highway costs occasioned by the prsence and operation of large and heavy vehicles.

Question #21's Answer (Cont'd.)

Moreover, rather than viewing taxes individually, we believe they should be viewed as a total tax package. Lighter vehicles tend to travel fewer miles and hence pay lower fuel taxes. They also tend to cost less and pay less excise tax. Under the present heavy use structure, lighter trucks also pay less. For example, a 4-axle tractor semitrailer weighing 60,000 pounds gross vehicle weight currently pays $1,238 while a truck-full trailer combination weighing 33 percent more at 80,000 pounds, pays $2,255 or 83 percent more in total highway taxes. The current structure of total taxes reflects the differences in gross vehicle weight.

In addition, DOT fails to appreciate the administrative burden in collecting a tax which so sharply and arbitrarily distinguishes between weight groups. In the Highway Cost Allocation Study (HCAS), Table I-9, DOT lists 3 different GVW groups for option 2B: (1) 33 $\leq$ 70,000 pounds GVW; (2) 70 $\leq$ 75,000 pounds GVW; and (3) $>$ 75,000 pounds GVW. Although a footnote indicates "the rates could be more smoothly graduated by weight," the fact remains that a truck with a GVW of 69,000 pounds would be paying 139 percent less per 1,000 pounds than a truck weighing only 2,000 pounds more at 71,000 pounds GVW. Even if the tax rates were more "smoothly graduated by weight," the effective differences between the rates are significant, and could amount to as much as $900 for a vehicle weighing 1,000 pounds more.

Question #21's Answer (Cont'd.)

Finally, while the heavy vehicle use tax is not actually based upon gross vehicle weight, the tax schedule (Form 2290) developed by the Internal Revenue Service produces a fair approximation for gross vehicle weight and avoids underreporting of GVW. For example, if the heavy use tax were based strictly on gross vehicle weight, a 5-axle tractor semitrailer at 78,000 pounds GVW would pay $234, instead of the $210 currently paid based upon the size of the tractor. On a total tax of $1,746, this difference amounts to 1.3 percent of the total highway user fee.

Question #22

> What percentage of the truck use tax would you estimate is not being collected at present? How could administration and compliance be improved?

Answer

On the basis of data contained in the Truck Inventory And Use Survey of the Census of Transportation, we estimate that under collection of the truck use tax ranges from 15 to 25 percent. As long ago as 1956, ATA proposed some form of sticker or decal should be issued annually to provide proof of payment of this tax on the vehicle. This proposal has not proved acceptable to the Internal Revenue Service and hence was never adopted.

Consequently, ATA has proposed, in recent years, that the use tax be tied to truck registration at the state level. Most states now collect truck registrations fees on the basis of owner declared maximum gross weight, so there would be no problem for these states to collect a gross weight use fee at the same time. This would clearly improve administration and compliance. This proposal is contained in my testimony of August 10, 1982 on the industry's comprehensive highway tax program.

Question #23

What is your view of the States participating in the collection of the truck use tax?

Answer

As indicated in the answer to #22, ATA originated the concept that the use tax be collected at the time of truck registration in the States. States could then remit the tax due, less a service charge, to the Treasury. Payment of the tax at the time of state vehicle licensing or registration would have to be made a requirement of Federal law to implement this program.

Question #24

> What are your views on the current taxes on tires, tubes, and tread rubber? Should any of these taxes be eliminated or modified?

Answer

Our views on the current tax on tires, tubes and tread rubber were set forth in our testimony on August 10, 1982. Part of our tax recommendations for enhancing the revenues into the Highway Trust Fund was an elimination of the current 10 cent per pound tax on tires weighing 50 pounds or less (passenger cars and light truck tires) but an increase from 10 cents per pound to 15 cents per pound on tires weighing more than 50 pounds (heavy truck taxes). We also recommend an elimination of the present tax on tubes.

Our program also included an increase of from 5 cents per pound to 7.5 cents per pound for retread rubber.

Question #25

Similarly, what chenges, in any, would you suggest in the current taxes on new trucks, truck parts and accessories?

Answer

Our highway tax program recommended retaining the current 10 percent tax on new trucks and trailers over 10,000 pounds gross vehicle weight. We also recommended an increase of from 8 percent to 10 perent of the manufacturer's excise tax on truck parts and accessories for trucks over 10,000 pounds GVW.

This tax change plus the tax changes on tires and tubes is designed to enhance revenues into the Highway Trust Fund, and increase the average tax paid by 5-axle tractor semitrailers 33 percent from $1,746 to $2,317.

Question #26

Several States have implemented an indexed fuel tax. What is your opinion of indexing?

Answer

Currently, nine states have a so-called "indexed" fuel tax. Actually only one -- Delaware -- has a truly indexed system where the tax is a fixed percentage of the price of the fuel. The rest of the states have established maximums -- thus effectively negating the index feature.

Indexing the fuel tax assumes that the cost of the highway program has a direct relationship to the price of fuel and inflation. Yet, DOT in the Highway Cost Allocation Study (HCAS) found that "the price of motor fuel is not likely to vary closely with either the general rate of inflation or inflation in the highway construction sector of the economy."

Finally, an underlying assumption in indexing is that prices will always increase. Yet, 1982 has witnessed a significant decrease in the price of fuel.

For these reasons, we oppose an indexed fuel price. However, opposition to the indexed fuel tax should not obscure the fact that the existence of the fuel tax at 4 cents per gallon since 1961 has resulted in a lack of adequate funding for the highway program.

Question #27

What effect would increasing only the Federal gas tax have on the equitable distribution of costs among user classes?

Answer

ATA assumes the question refers to the Federal fuel tax, and not just the Federal gas tax. If the Federal fuel tax were increased to 8 cents per gallon, all trucks would be reduced from 50 to 44 percent of all user fees and heavy trucks over 26,000 pounds gross vehicle weight would reduce from 25 percent to 20 percent. Since the trucking industry would no longer be paying its fair share, the industry has difficulty supporting a tax proposal which would result in our not continuing to pay our fair share.

Question #28

Because of the cyclical nature of the trucking industry business, would not your industry be better off with a per-mile user fee rather than a lump-sum fee?

Answer

While the industry might be better off with a tax directly related to use such as a fuel tax, as indicated in the answer to #18, the Highway Trust Fund and the program it supports would not. The Fund must be supported by a combination of taxes which will finance a consistent program in the good years as well as the bad.

In 1979, mileage-related taxes for heavy trucks -- fuel, tires, tubes, retread rubber, lubricating oil, and parts and accessories -- accounted for 48 percent of the tax collections. Lump-sum fees -- excise and heavy use tax -- accounted for 52 percent of the collections. We believe this balanced combination approach is in the best interest of the Trust Fund.

Question #29

> CBO testified that under staff alternatives 1 and 3, "the likely impact on truck operations should be quite modest. Total trucking costs, including the cost of the driver and distribution costs, are likely to rise by between 1.4 and 1.8 percent." What are your estimates?

Answer

We have been unable to duplicate the CBO estimates. However, using data published by the U.S. Department of Agriculture which estimates total truck costs per mile, ATA estimates that Alternatives #1 and #3 would increase truck operating costs anywhere from 2.7 to 2.8 percent, while Alternative #2 would increase costs 0.6 percent.

For owner-operators, who have lower total costs per mile, Alternatives #1 and #3 would increase costs from 3.4 percent to 3.6 percent, while Alternative #2 would increase costs 0.8 percent.

As indicated in my testimony, even an increase of 0.6 percent, such as proposed by ATA in Alternative #2, must be considered in light of the poor financial situation facing the motor carrier industry before determining whether the increase is "modest".

> At the year-end 1981, the operating stood at 96.7, the highest operating ration in twenty years. Ordinary income after taxes was 1.75 percent of revenues, or only about half the historical "normal" return. About one-fourth of the carriers in the industry incurred operating losses for the year and an additional 31 are only marginally profitable -- with operating ratios of 97 or higher.

Obviously, any change in the taxes which increases operating costs as much as 3.6 percent will be devastating, wiping out any profit.

Question #29's Answer (Cont'd.)

The attitude expressed by the CBO, and especially Dr. Rivlin, who stated during the question and answer period that increased taxes could be paid out of carrier profits is callous at best and ignorant at worst.

Question #30

> In the competition for freight traffic, the railroads' share has been declining, while trucks' share has steadily increased. How much freight business is rail truck competitive and what economic impact do you foresee on the heaviest trucks are raised?

Answer

The rails' share of freight traffic has not been declining while trucks' has steadily increased. Since 1977, the motor carrier share of tonnage has declined from 39.1 percent to 36.5 percent while the rail share has increased from 26.7 percent to 28.9 percent.

Obviously, not all freight traffic is competitive. However, most traffic hauled by trucks over 70,000 pounds is considered competitive with rail piggyback service at distances up to 900 - 1,000 miles. As indicated in my answer to question #29, it is estimated that tax alternatives #1 and #3 will increase the operating costs of the heaviest trucks anywhere from 2.7 to 3.6 percent. If the carrier cannot absorb the increase and passes it on to the consumer, it is unknown whether such an increase would be enough for shippers to switch from truck to rail. Undoubtedly, in some instances shippers will reevaluate their mode choice.

Question #31

> The railroads argue that they should carry loads of 50,000 pounds or more while the trucking industry continues to seek an increase in the Federal weight limit of 80,000 pounds. Isn't there some point at which truck weight becomes too heavy and hence a major factor in highway deterioration?

Answer

We believe that truck weight limit should be determined by the design capabilities of the highway system and not be arbitrary limits proposed by the railroads. Modern highways have been designed to accommodate specific axle loadings together with gross weights in accordance with Bridge Formula B (Table B) as developed by the Federal and state highway engineers. This formula is designed to protect bridge structures on the highway system. Gross weight has little to do with pavements; the pavements are designed to carry axle loads, not gross weight. The axle loads currently in the Federal law were supported by DOT and AASHTO, and by the new DOT Federal size and weight study. Therefore, the industry's size and weight policy will be within highway capability. It is the highway design formulas which should control truck gross weights and not an arbitrary weight selected or promoted by the railroad industry to enhance their perceived competitive position.

Question #32

> In the General Accounting Office's 1979 study, Excessive Truck Weight: An Expensive Burden We Can No Longer Afford, there was an estimate that trucks run overweight more than 20 percent of the time. What are your most recent estimates?

Answer

We responded to the General Accounting Office's 1979 study, Excessive Truck Weight: An Expensive Burden We Can No Longer Afford, in our testimony on September 5, 1979, before the Subcommittee on Oversight. At that time, we pointed out the confusion and misunderstandings as to what is meant by heavy trucks, and the traffic of these vehicles as related to highway deterioration.

The GAO report confused "illegally" overweight trucks with legal acceptions to existing state weight limits as well as relation of these weights to Federal limits.

For example, using the Federal Highway Administration's 1975 National Truck Characteristics Report, the GAO study alleged that 22 percent of 5-axle tractor semitrailer combinations were operating over state weight limits. What the GAO report failed to state, but which more complete evaluation of the source data would have revealed, is that the alleged overweights included (1) cases of multiple overweights for the same vehicle, arising from the fact that a gross load overweight, an axle load overweight and an axle group overweight will often go together; (2) operations within statutory allowable tolerances which are provided to compensate for load shifting and scale inaccuracies;

Question #32's Answer (Cont'd.)

and (3) statutory and administrative allowances designed to meet specific agricultural and industrial needs. Legal overweight special permit operations are also included in the alleged overweight violations. The GAO may wish to call these overweight operations, but they are not illegal.

Confusion also seemed to persist regarding the relationship of the new Federal weight limits enacted in 1975 and the grandfathered weights as they relate to highway capabilities.

With these confusions in mind, it is unfortunate that the GAO report was given the misleading title "Excessive Truck Weight: An Expensive Burden We Can No Longer Afford" without making it clear as to exactly what "excessive" truck weight is or is not.

When we eliminate from the General Accounting Office study trucks that are not illegally overweight and eliminate the double counting for trucks that are overweight by both axle weights and gross weights, the 20 percent figure is reduced to approximately 6 or 7 percent.

Our testimony has publicly testified on numerous occasions that we condemn illegally overloaded trucks which violate established state size and weight standards. We support vigorous enforcement of existing size and weight laws. We also supported, and the Surface Freight Transportation Assistance Act of 1978 so provides, Federal aid for weight enforcement. An important element of this support is our endorsement of the use of highway construction funds for permanent weigh stations.

Question #33

The truck size and weight issue is before a number of State legislatures as well as Congress. What do you see as the major considerations in any proposal to raise size and weight limits?

Answer

There are three major considerations that accompany any proposal to increase size and weight limits: transportation costs, highway costs, and safety impacts. The Final Report on An Investigation of Truck Size and Weight Limits submitted to Congress by the DOT in 1981 clearly indicates that an increase in truck size and weight will benefit the national economy. This means that the motor carrier industry should be allowed to operate in every state with a minimum gross weight of not less than 80,000 pounds; a tractor semitrailer length limit of 60 feet; a tractor semitrailer full-trailer combination length limit of no less than 65 feet, and a width limit of no less than 102 inches. At the same time, we believe the states should be allowed to have gross weights greater than 80,000 pounds as long as the gross weight is compatible with the gross weight produced by the application of Table B, the formula currently in Section 127, Title 23, U.S. Code.

Since there are still three states that do not allow the 80,000 pounds, the current maximum in the Federal law, and since there are still 15 states that do not permit the 65-foot length necessary for the twin trailer operation, we believe the only

Question #33's Answer (Cont'd.)

feasible solution is Congressional action to require the states to allow at least these minimum standards in order that our modern highway system may be used in line with the capabilities which are designed into the highway system. To do less than this means that we have invested billions of dollars into a modern highway system which is not being allowed to return maximum investment because of the limitations of truck productivity.

Question #34

> The Oregon DOT has stated, "(w)e have also observed that longitudinal cracking in pavements can either be environmentally or load caused. . . . However, without heavy wheel loads, these cracks require little or no maintenance in Oregon's climate." What is your reaction to this statement?

Answer

The Oregon DOT statement, as reported, is typical of the generality that is sometimes utilized to support particular points of view. In fact, there is a considerable difference in both the types of longitudinal cracking and their probable cause that occur on portland cement concrete and asphalt highways. In a report relative to 19 flexible (asphalt) pavement projects surveyed throughout the country in a FHWA sponsored research project,[1] the following statement is made on longitudinal cracking:

> "This distress type, which existed on 11 of the 19 surveyed projects, almost always occurred at the lane construction joint near the lane strip marking. The basic cause was usually attributed to poor joint construction practices. During the construction, the joints are allowed to cool, usually without compaction, until the paver passes in the adjacent lane."

The statement proceeds to point out that the material is weakened as a result of lack of immediate compaction and that temperature induces stresses, possibly coupled with water and de-icing salt entry, causes the longitudinal cracking. CounselTrans observed other longitudinal cracks on flexible pavements to be obviously caused by embankment slippage (poor foundation soils).

1/ Zero-Maintenance Pavements: Results of Field Studies on the Performance Requirements and Capabilities of Conventional Pavement Systems, FHWA-RD-76-105, page 99.

Question #34's Answer (Cont'd.)

On rigid pavements, this statement occurs in two places in another authoritative publication,[1/] also as a result of research sponsored by FHWA:

> "Longitudinal cracks occur generally parallel to the centerline of the pavement. They are often caused by improper construction of longitudinal joints, or by a combination of heavy load repetition, loss of foundation support, and thermal and moisture gradient distresses."

In a third case in the same publication (as applied to continuously reinforced pavements), the statement leaves out any load contribution. In another reference related to a more general type of longitudinal cracking on rigid pavements,[2/] no load contribution is indicated.

In its distress survey, CounselTrans discounted load contribution in the case of this type of distress on rigid pavements for several reasons including: (1) if often had no relationship to joints, occurring in the middle section of the pavement; (2) it was often present as an isolated condition on pavement slabs in situations where there were obvious drainage problems; and (3) it did not often occur in conjunction with clearly load-related types of distress.

Thus, non-load causes for longitudinal cracking would certainly seem to take precedence in objective research and no study suggests that loading is a significant cause of pavements without underlying defects.

[1/] Highway Pavement Distress Identification Manual, FHWA, March 1979 (Interim Report), pps. 75, 124, and 176.

[2/] Standard Nomenclature and Definitions for Pavement Components and Deficiencies, Special Report 113, Highway Research Board, 1970, p. 22.

Question #35

Both the Arkansas and Louisiana DOTs have asked trucks to use the left lanes on certain Interstate highways. Why do you believe this request was made?

Answer

This is a loaded question. There are obviously at least three possible basic reasons for publicly making this request: (1) because more significant damage to the pavement is observable in the right lane; (2) because more apparent surface wear, not really affecting pavement service qualities to a great degree and relatively inexpensive to correct, occurs in the right lane; and (3) purely as a political ploy to make a case for damage done by trucks in a program oriented toward obtaining higher taxes from trucks. Trucks may be singled out in the latter case because of predicted legislative opposition to a more general tax increase.

We do not know which of these reasons inspired the Arkansas and Louisiana Departments of Transportation to request trucks to use the left lane. We have not seen any factual survey information on comparative pavement condition in the two lanes.

Arkansas' Interstate pavements are in good condition for their relative age. Only 30 percent of the Interstate pavements in this state have current PSI/PSR ratings less than 3.0. In general, this means that no more than 1" to 3" of overlay is needed to completely restore original levels of service to all but a small proportion of Arkansas' Interstate mileage. This is a much better situation than occurs in a large number of states.

Question #36

> There has been frequent reference to the Baltimore-Washington Parkway as an example of a highway which is deteriorating despite the absence of truck traffic. AASHTO testified last month that a highway's service life is finite. Since the B-W Parkway is 22 years old, can't it be argued that it has, in fact, lasted its intended service life?

Answer

We agree that the service life of a given highway pavement is finite, and the fact that the Baltimore-Washington Parkway had to be rehabilitated in about 22 years is one of the major points we have been making. Since the DOT philosophy, and the factors which are used to allocate pavement costs, essentially ignore the real world performance of parkways such as the Baltimore-Washington, the DOT "relative consumption" procedures result in a large "overcharge" against heavy vehicles.

There is, in fact, a general misunderstanding about pavement design life and service life. The AASHTO Interim Guide for the Design of Pavement Structures, 1971, addresses this issue on page 7, under the Traffic paragraph:

> Neither the traffic analysis period nor the time a pavement reaches its terminal serviceability index (pt) should be confused with pavement life. Pavement life may be extended by periodic renewal of the surface. Also surface renewal may be necessary for reasons other than restoration of serviceability (such as renewal of antiskid properties or rejuvenation of weathered surfaces).

Question #36's Answer (Cont'd.)

Formal pavement management techniques now seek to accomplish periodic renewal at the lowest "annual cost." The time of renewal may be dictated by many factors, and loss of serviceability is not a good indicator of the overall need. This is another problem with the DOT consumption approach, as it presumes a very strong relation between the loss of serviceability (PSI) and the timing and cost of surface renewals.

Question #37

It has been said that toll roads could better match rates to actual road costs. What is your position on toll financing of highway?

Answer

The trucking industry has been and is opposed to the toll financing of highways. One of the initial objectives of the 1956 program which started the construction of the "Interstate System of Defense Highways" was to halt the progress of toll-road construction. It was felt that the nation needed a modern system of interstate highways and that they should be free highways in terms of no toll financing. To the contrary, these highways should be paid for through equitable highway user taxes rather than through specific tolls on independent road segments. However, those who classify the present highway tax structure as unfair to the passenger car and light trucks, often contend that the better system of road financing is the value of service criteria, exemplified in toll road financing. Under the present federal highway tax structure, the typical large intercity truck is paying federal highway user taxes on a per-mile rate of eight times more than the typical passenger car. A study of the relative rates per mile on the nation's toll roads show per-mile payment for the heavy truck 5-6 times that of the passenger car. If the proponents of the system of highway financing, such as the railroads, would agree to federal highway tax structure equivalent to the toll road tax structure, which would mean a reduction in the heavy truck taxes, down from 8 times to 5 times that of a passenger car, it is a proposal we would be willing to consider.

Question #38

> At what point does the road damage and deterioration become so severe as to constitute a major, national problem? How large-scale are the highway infrastructure needs at present?

Answer

There is general agreement among all highway users that general pavement deterioration is so severe as to constitute a major, national problem. For example, Interstate highways are built to have a design life of 20 years. Currently, some 2,000 miles a year are reaching the end of their design life. Estimates of infrastructure needs in 1985 range from a low of $13 billion by the Federal Highway Administration to $28 billion by General Motors, which recommended significantly higher outlays for non-interstate programs, particularly urban highways. Regardless of the estimates involved, all users would concur with a recent Congressional Budget Office report which concluded that the current program is trying to do too much with too little.

At the 1981 annual convention of the American Trucking Associations, Inc., Bennett C. Whitlock, Jr., President, pointed out to the Board of Directors that it was becoming more obvious that unless additional funding were available for the Federal-aid highway program, particularly adequate funding to complete the Interstate System and to keep that system in proper condition, the trucking industry, along with other key sectors of the economy, would face serious problems. As a result of that presentation, a special blue ribbon committee was appointed to develop a comprehensive highway program. That committee's recommendations were accepted by the Executive Committee in February 1982, and presented in ATA's testimony of August 10, 1982.

Among all the interested parties -- highway users; government officials, both legislative and administrative, and the public, only the trucking industry has developed a specific, feasible, workable plan to relieve the highway ills. Our highway program contains the foillowing four objectives:

(1) Complete the Interstate System by 1990 without sacrificing design standards;

(2) Restore the Interstate System to as good or better condition as when it was first built;

(3) Continue basic Federal-aid for highway construction programs on our primary, secondary and urban highways; and

(4) Reconstruct or rehabilitate all bridges on the Federal-aid system by 1990.

These are comprehensive goals which will require a great deal more than the 1982 authorization levels. Our program calls for authorization levels by almost double by 1986.

Not only did ATA recommend a program with specific authorization levels, but also it recommended a tax structure -- based upon a proven, consistent highway cost allocation method -- which could finance its program. As indicated in ATA's testimony, the tax program makes the following recommendations:

- Increase the 4-cent per gallon tax on fuel (gasoline, diesel and special fuels) to 6 cents a gallon with an additional one-cent increase October 1, 1985.

Question #38's Answer (Cont'd.)

- Make no change in the current 10 percent manufacturers' excise tax for trucks and trailers over 10,000 pounds GVW.
- Eliminate the current 10 cent per pound tax on tires weighing 50 pounds or less.
- Increase from 10 cents per pound to 15 cents per pound the taxes on tires weighing more than 50 pounds.
- Eliminate the tax on tubes.
- Increase the retread rubber tax from 5 cents per pound to 7.5 cents per pound.
- Increase the current 8 percent manufacturers' excise tax on truck parts and accessories (for trucks over 10,000 pounds) to 10 percent.

These changes in the tax code would increase revenues to the Trust Fund by 36 percent to $9.6 billion prior to Fiscal years 1983 and 1984 and $10.5 billion after FY 1985. This amount coupled with the current surplus and interest in the Trust Fund can finance the ATA program.

Statement By

William J. Morgan
Member of Board of Directors
Private Truck Council of America, Inc.

My name is William J. Morgan. I am Director of Traffic for Frito-Lay in Dallas, Texas. I appear before you today on behalf of the Private Truck Council of America which I serve as a member of the Board of Directors. With me today is Richard Henderson, Executive Vice President of the Council, and John DeVierno, of the law firm of Billig, Sher & Jones.

The Private Truck Council of America, Inc., is the only independent national organization representing non-transportation companies with respect to operation of trucks by those companies in the course of their own manufacturing, processing or other businesses. By all estimates, private trucking is not only the largest segment of the trucking industry, but also the fastest growing. PTCA's 1,800 member companies represent this Nation's Fortune 500 Industries as well as numerous smaller operations.

The membership of the Private Truck Council would like to commend you Mr. Chairman and the members of the Subcommittee for holding these hearings and and for recognizing the need to resolve the complex issues of highway funding and taxation.

We at PTCA believe that proper maintenance and continued development of this Nation's highways are critical to the economic health of the country. Improved highways and bridges will result in safe and efficient movement of people and goods to their desired destinations via the most economical route. The increased overall commitment to the highway funding needed for prompt and proper upkeep of our highways and bridges means more employment for out of work Americans, as they work to construct and maintain our highway system which itself has a beneficial impact on the productivity of our economy.

The PTCA believes that a sound financial plan will allow for the necessary monies to be made available in order to meet our mutual goal of an outstanding highway network, with the costs shared fairly by all users of the system. And we fully realize, Mr. Chairman, that an increase in monies paid by our vehicles is necessary to restore our highways to a safe and efficient operating condition.

However, to saddle one vehicle grouping with substantially more revenue responsibility amounts to a theme of an excessive tax increase. The recently completed DOT highway Cost Allocation Study represents a radical departure from previous methodologies used as the basis for schedules of highway user tax fees long in place. Furthermore, should the new taxes suggested by that study be enacted, a major portion of PTCA member companies will experience a sudden, tremendous and unfairly weighted jump in their federal tax responsibility.

Any unequally balanced and substantial tax increase must be looked at skeptically in light of the fact that this Administration and Congress are pledged to the principle that no new large financial burden be placed upon a less than prosperous American society at this time.

We do, however, recognize that in considering the allocation of highway costs among the various user classes, trucks should pay a greater share because of the weight factor. And that is what the use tax schedule should be designed to accomplish.

Turning to the specific alternatives before the committee today. Alternative 1, as describes in your letter of invitation to testify before this Committee, suggests an excessive use tax increase with respect to heavy trucks. For example, at the top end of the scale, the use tax increase would be nearly 1000%.

Alternative 3, while modifying slightly the present use tax on heavy trucks, would impose for the first time a use tax on lightweight vehicles. Lightweight commercial vehicles are generally used in local operations -- on streets and highways where local funding is more dominant, and thus lightweight vehicles should remain subject to only those local tax demands. In addition, alternative 3 proposes an over 200% increase in the diesel fuel tax. This is excessive, particularly when coupled with a large use tax increase.

Alternative 2, is closer in line with what we think is reasonable and fair. It will provide an increase of approximately $2½ billion in revenue to the Highway Trust Fund over current revenues, with a scheduled increase of $3½ billion in 1985. Also, we do not, at this time, rule out entirely a small increase in the fuel tax under alternative 2. Due to the diversity in size of our members it is not possible for me today to comment or commit to the idea of any use tax differential based on Gross Vehicle Weight Rating.

We believe, however, that the use tax increases on heavy trucks proposed in alternative 1, and the inclusion of a use tax on lightweight trucks in alternative 3, are excessive.

We also recommend that the Congress ought not to try and determine a schedule that would be permanent and fixed for the next 10 years. Rather, we believe that changes in the overall user tax structure should be reassessed 3 or 4 years from now. While we acknowledge that there is a need for tax changes to produce overall revenue increases, given that the approach used by the DOT in its Highway Cost Allocation Study represented a radical change from the past, we do not believe it is appropriate or prudent to move quickly to enact changes in taxes based on such different assumptions. In brief, moving to increase revenues is one thing that can be done quickly, moving quickly to change the underlying assumptions on the tax is entirely another thing.

Turning to the alternative plan modifications that this comittee has outlined in the letter of invitation to testify, we would oppose state participation in the collection of truck use taxes with the states retaining a certain percentage of the revenue for administrative costs. For one thing, there is the problem of uniformity of enforcement. A few slack states will attract many more truck registrations and decrease sorely needed revenues.

Also, we would not look favorably on the creation of a state bureaucracy to be monitored by a federal bureaucracy. We feel the current method of remitting the Federal Fuel and Excise taxes is better than segmenting collection among the states.

On the matter of aid to transit, we would point out that, historically, we have always opposed diverting highway use taxes to transit. We submit that transit facilities are largely for local jurisdictions to build and finance.

Further, while the theory that improved transit should lessen metropolitan area congestion, thereby easing the operation of motor vehicles in these areas may appear to be convincing, the hard evidence to really back this up is thus far, lacking.

We would point out, however, that whatever level of Federal user tax increase we as private truck operators support to improve and upgrade our highway system, is contingent upon the Federal Government taking steps to improve the productivity of truck transportation.

Specifically, we are referring to those provisions in S. 1402, the Uniform Motor Vehicle Standards Act, which has cleared the Senate Commerce Committee, and an additional weight provision added by the House Public Works and Transportation Committee in the markup of H.R. 6211 which would require all states to permit 80,000 lb. GVWR vehicles to operate on the Interstate System. And also require states to permit 102 inch width vehicles on the Interstate System.

Mr. Chairman, to relate the size and weight issue to the specific issues of highway needs and revenues, I want to emphasize that the size and weight relief we seek would not have any significant effect on highway revenue needs.

On this point I would like to insert into the record an assessment recently made by the Department of Transportation at the request of the House Public Works Committee as to the costs and benefits of the size and weight relief sought. (See Attachment 1.)

These DOT estimates show tremendous overall benefits to the national economy. The increased productivity, through reduced transportation costs, is such that the overall benefit to cost ratio of enacting size and weight relief is over 35 to 1. I repeat; 35 to 1.

Mr. Chairman, I have been in the transportation business most of my life and I must admit that I have never, until this time, heard of a single proposal in the transportation area with such a clearly beneficial impact.

We in the private sector of the economy are doing our best to try and increase output and make American companies more competitive with foreign industries. I think that the tremendous record developed by the Senate Commerce Committee on S. 1402, coupled with these more recent DOT statistics, present a compelling and irrefutable case for enactment of size and weight relief by this Congress, either by enactment of separate legislation, such as S. 1402, or as a part of the needed extension of the highway program that must be acted upon in the near future.

And the other important aspect of this DOT analysis, of course, is that on the cost side, the increase is negligible in the context of the overall highway program.

I therefore want to suggest that this Committee and the Congress, if it cannot reach agreement at this time on all of the complex issues regarding highway revenues and program needs, ought not to miss the clear opportunity to do something so clearly beneficial as reforming our truck size and weight laws. Mr. Chairman, this is a real chance for you to do something to tremendously increase productivity in the economy, and we see no reason why the Congress should delay action on this any further.

Finally, on the size issue, I would like to return to the provisions of S. 1402 and its impact on private truck operators.

The major provisions in S. 1402 which we strongly support would be:

- prohibit trailer length restrictions less than 48 feet and prohibit overall length restrictions;
- establish a 102 inch width limit for trucks (this width limit has been allowed on buses for some time now);
- allow operations of tractor and twin trailer combinations on the Interstate System with no restrictions less than 28 feet on any unit; and
- preserve the grandfather clause embodied in S. 1402, wherein states are prohibited from imposing regulations more restrictive than those in force on the date of enactment of the legislation.

We support the minimum trailer length of 48 feet in order to offset current efforts in some of the states to restrict trailer lengths to 45 feet. There are many private truck operators who use trailers in excess of 45 feet. They are used to transport a wide variety of commodities such as; food items and materials, empty cans, plastic containers, styrofoam products, clothing, home furnishings and auto parts, which fill the cubic volume of the vehicle long before reaching the weight limit of the vehicle.

There is no evidence to indicate that trailers longer than 45 feet (in most cases, we're talking about 48 foot trailers) are less safe. The accident frequency rate with my fleet, for example, is no greater with the long trailers than with those 45 feet or less. Trailers longer than 45 feet comprise 34% of the total fleet; however, have been involved in only 22% of the total accidents over the past three years. This same private fleet has a three year average of 3.0 accidents per million miles, which is well below the national average for similar private fleets as statistics from the National Safety Council indicate.

A 45 foot trailer limitation reduces productivity and is less fuel efficient. For example, taking the difference between a 45 foot and 48 foot trailer, the 48 foot unit has 7.16% more cubic space. Using 45,000 miles per trailer per year -- which is taken from one fleet's actual experience -- this lesser volume would increase mileage from 18 million miles per year to approximately 19.2 million miles per year. At 6 mpg on the power unit, it would take an additional 200 thousand gallons of fuel to deliver the same amount of goods. Further, the capital investment in additional equipment (12 tractors and 27 trailers) would exceed a million dollars. This is but one example typical among thousands of private fleets. There are a great number of both private and for-hire fleets -- large and small -- with the need for trailer equipment in excess of 45 feet.

Similarly, allowing double bottoms, or twin trailers, on the Interstate System would greatly increase productivity and enhance fuel economy. No valid evidence exists which would indicate that a multi-vehicle combination of 65 feet is more onerous, difficut to handle or unsafe than any other combination vehicle.

The matter of greater uniformity for weight limits is also vitally important. At the moment, Arkansas, Illinois and Missouri have not increased their maximums to 80,000 lbs. These are all so-called "bridge states" and their restrictions affect the flow of interstate commerce beyond their borders causing carriers to waste mileage, time and fuel to take circuitous routes, or use less efficient vehicles.

I would like to emphasize that in each of the instances of size and weight relief I spoke to, we are not seeking an increase, raising the possibility of additional required road maintenance, but greater uniformity of standards which, for the most part, have been in place in all but a few states. In those few states where such standards are drastically below national norms, it negatively affects efficient movement by motor carriers operating throughout the Nation. These negative affects are trickled down into everything manufactured, processed and eventually used by the consumer.

These points from our own experience, Mr. Chairman, I think provide strong support to the huge benefit to cost ratio of size and weight reform set forth by the DOT which as I also indicated, will have a negligible effect on overall highway needs.

Now I would like to turn to a different aspect of the relationship between highway taxes and program levels and offer to the Committee today what we consider to be a new and very important proposal regarding the rate of spending of taxes collected and the maintenance of what we consider to be an unnecessarily large balance in the Highway Trust Fund.

Recognizing this and realizing that we are facing tax increases in the near future, we propose that the taxes themselves or some portion of the taxes should be contingent upon the actual expenditure of taxes already collected. In brief, we believe that the law itself should provide that if the Trust Fund balance rises above a specified level (significantly lower than the present balance) the taxes should be discontinued in whole or in part until the balance is reduced.

As this subcommittee is undoubtedly aware, a variety of approaches to address this problem in the context of airport and airway legislation in this Congress are making progress and we believe that a similar approach should be developed and included in highway taxing and spending legislation.

I also submit, Mr. Chairman, that this is simply a good business practice. Failure to promptly spend these monies as they are collected, for needs that are clearly there, is asking the American taxpayer to support a huge escrow fund. If the taxes are needed, and collected, they should be spent as efficiently and promptly as possible for the purpose for which they were collected.

Finally, as Congress and this Committee consider the additional revenues needed, and in particular the increased level of taxes to be paid by trucks, they should be aware of similar actions already taken by states, and even by some municipalities.

In 1981 and, thus far in 1982, 24 states have increased their fuel taxes, with increases ranging from 1/10th of a cent to 4.7¢ a gallon. These fuel taxes, of course, apply to hire and private carriers alike. These significant increases, we believe, are known to the Committee and we believe, should be taken into account in reaching final decisions on Federal user taxes.

However, this Committee may not be aware that, in some cases even at the municipal level, private carriers are being required to purchase municipal or city permits for the purpose of picking up or delivering in that municipality. These new taxes are also an important cost for our members.

The city of Detroit, for example, requires each truck using the city streets to be permitted at $17.00 per vehicle. The city of Chicago requires a $50.00 permit per tractor. Even a town as small as Brandenburg, Kentucky (population 1,638) requires a $25.00 permit, covering the entire fleet.

Such taxes are rapidly becoming a costly barrier to commerce and a threat to local job security as realistic business decisions are made as to whether a company continue to operate in or through each taxing municipality.

Any increase in the federal user truck tax will of course be in addition to these state and local user taxes. But they all add up to increased costs of truck transportation. They are all part of the same picture, the cost of doing business. Uncoordinated highway tax solutions by Federal and State governments will surely mean a rapid and sharp rise in the cost of consumer goods.

In conclusion, Mr Chairman, I would like to recap our major points. 1. Some highway revenue increases are necessary but we believe that those monies collected should be spent on our highway network; 2. the increased taxes should be fair, and not excessively tax one vehicle grouping or another; 3. we view the highway issue as closely linked to size and weight relief which already has a headstart in Congress and should be enacted promptly; 4. we feel that it is very important to spend the money in the Highway Trust Fund on our Nation's Highways. A draw down on the Fund with some type of statutory mandate for this prompt spending not only ensures more effective use of highway dollars, but is simply good business.

The Private Truck Council fully supports the Committee's efforts to strengthen our highway system, Mr Chairman, and will continue to work with you and the Committee to insure an equitable solution to highway problems.

Mr. Chairman, I want to thank you for the opportunity of testifying before your Subcommittee today, and at this point we would be pleased to answer any questions you may have.

10 August 1982

ATTACHMENT # 1.

U.S. Department of Transportation
Office of the Secretary of Transportation

400 Seventh St., S.W
Washington, D.C. 20590

RECEIVED
MAY 12 1982
PUBLIC WORKS AND TRANSPORTATION COMMITTEE

The Honorable Glenn M. Anderson
House of Representatives
Washington, D.C. 20515

Dear Mr. Anderson:

During my testimony on May 5, 1982 before your subcommittee, you asked me if we could provide estimates of the highway cost impacts of S.1402. I promised a quick "back of the envelope" response, which I am submitting for the record as an enclosure to this letter. Our analysis is comparable to that submitted both in our report An Investigation of Truck Size and Weight Limits, and the supplemental analysis provided Clyde Woodle dated April 15, 1982.

Cost estimates are provided for both the increase in pavement maintenance and overlay costs, as well as the savings in transportation costs. Estimates are provided both for a single year (1985), as well as a net present value for the period beyond 1985. The assumptions used in this quick analysis are described in the enclosure.

I hope you find this information helpful. I am available to discuss this material at any time.

Sincerely,

Charles Swinburn
Charles Swinburn
Deputy Assistant Secretary for
Policy and International Affairs

Enclosure

Effects of Senate Bill S.1402
Length and Width Limit Changes

The analysis of the impacts of the increase in length from 45 feet to 48 feet for semi-trailers and from 27 feet to 28 feet for doubles trailers is reported separately from the impacts due to the increase from 96 inches to 102 inches in width. This was done because the length limit changes in the bill are mandatory minimums while the width limit is a permissable maximum. All impacts are reported as changes from the Base Case (i.e., assuming current laws are in effect). In addition to the trailer length changes, the results also include the effects of eliminating the three barrier states and allowing "doubles" to operate over the full Interstate Highway System.

Our basic assumption regarding the traffic is that 50 percent of general commodity carrier LTL and PTL, other low density and Western doubles traffic would be affected by the length and width increases. This assumption may be overly optimistic. To the extent that it is, both increased pavement costs and transportation cost savings are proportionately too high.

Results

1985 Costs in Millions of 1980 Dollars

	Transport Costs	Pavement Maintenance and Overlay Costs (Total Fed.-Aid System)
Change in Length	$-1,753	$+231
Change in Width & Length	-2,495	+254

Net Present Value Cost Impacts

	Transport Costs	Pavement Maintenance and Overlay Costs
Change in Length	$-24,050	$+829
Change in Width & Length	-34,230	+911

PIC A

PRIVATE TRUCK COUNCIL of AMERICA, Inc.

1101 SEVENTEENTH STREET, N.W., WASHINGTON, D.C. 20036
(202) 785-4900

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Joseph M. Normandy, *Executive Assistant*

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* Past President

October 18, 1982

The Honorable Steven D. Symms
Chairman, Subcommittee on Transportation
Committee on Environment and Public Works
United States Senate
452 Russell Senate Office Building
Washington, D.C. 20510

Dear Senator Symms:

Enclosed are the answers of the Private Truck Council of America to the questions submitted as a follow-up to testimony delivered before your Committee on August 10, 1982 on highway program needs, revenues, and cost allocation issues.

Mr. William Morgan who testified on that date asked that I forward them to you.

Please feel free to call us if you need any additional information or clarification of the answers provided.

May we commend you for the extremely thorough job you are doing on this entire issue.

Sincerely,

Richard D. Henderson

Richard D. Henderson
Executive Vice President

RDH/cls
Enclosure

DEVOTED EXCLUSIVELY TO THE INTERESTS OF PRIVATE TRUCK OPERATORS

FOLLOW-UP QUESTIONS FOR THE PRIVATE TRUCK COUNCIL OF AMERICA, INC.

1. At our August 10, 1982 hearing, Mr. Morgan testified that the PTCA membership is composed of 1,800 companies. Can you provide us with a breakdown of the truck classes you represent, i.e., (1) pickups and vans; (2) other single unit trucks weighing less than 26,000 gross vehicle weight; (3) single trucks weighing more than 26,000 GVW; (4) combination trucks weighing less than 50,000 GVW; and (5) combination trucks weighing more than 50,000 GVW?

2. Both the U.S. Department of Transportation's recommended cost allocation approach as well as the incremental method favored by the American Trucking Associations show that the lighter trucks have been subsidizing heavy combination trucks. Since you represent a range of truck classes, do you believe there should be a redistribution of tax responsibility among truck classes or should this subsidization continue?

3. Mr. Morgan stated in his testimony that "to saddle one vehicle grouping with substantially more revenue responsibility amounts to a theme of an excessive tax increase." The DOT highway cost allocation study used 38 vehicle categories--from motorcycles to the heaviest combination trucks--in its analysis, stating:

> It is only reasonable that vehicle categories must reflect all of the generic differences found in motor vehicles, e.g. automobiles, buses, single unit trucks and combination trucks. Additionally, it is necessary to divide the vehicle classes into weight groups as costs track with weight by varying relationships.

Which vehicle grouping does the PTCA feel would be asked to pay more than its share of cost responsibility?

4. What is the PTCA's response to the DOT study finding that in 1985 under the current tax system automobiles will pay 100 percent of their cost responsibility; pickup trucks and vans 110 percent; other single unit trucks 200 percent; combination (single and double trailer) trucks of less than 70,000 pounds registered GVW 125 percent; and combination trucks over 70,000 pounds 65 percent?

5. PTCA has recommended that increased user fees "should be spread across the spectrum of vehicle classes." If the current system of user fees is inequitable, how would that bring about fairer payment of Federal road use taxes among the various vehicle categories?

6. Although gasoline and highway construction costs have soared, the Federal motor fuel tax has remained at 4 cents per gallon for over 20 years. Since the highway program has traditionally been user financed, how would PTCA suggest that the tax rate, which was imposed in 1959, be changed to keep pace with present needs?

7. Cars are becoming smaller and lighter while trucks become larger and heavier. Also, the percentage of cars in the vehicle traffic stream is declining while the percentage of combination trucks increases. Given this, what changes, if any, do you believe should be made in the system?

8. In meeting the Congressional mandate, DOT maintains that it has carried out a comprehensive study of the costs occasioned in relation to the Federal user charges those vehicles currently contribute to the Highway Trust Fund. Do you disagree with the concept of making cost assignments on the basis of cost responsibilities?

9. Some of the States presently impose differential gasoline and diesel fuel tax. The DOT study suggests that consideration be given to such a fuel differential at the Federal level. Since diesel powered vehicles have greater fuel efficiency and do not contribute as much revenue per mile of travel as gasoline powered vehicles, why wouldn't this be a fairer way to tax?

10. What effect would increasing only the Federal gas tax have on the equitable distribution of costs among the user classes?

11. Do you believe all trucks should pay the same rate of excise taxes regardless of how many miles they are driven per year, or should miles driven be reflected in all the tax rates rather than just in the fuel taxes?

12. In the PTCA testimony, there is a recommendation that Congress not move quickly to enact changes in highway taxes. Many believe that changes in the Federal highway tax structure are long overdue. Why does PTCA advocate waiting for another 3-4 years?

13. The truck size and weight issue is before a number of State legislatures as well as Congress. What do you see as the major considerations in any proposal to raise size and weight limits?

14. Highway engineers and pavement experts often point to the interactive effect between loads and environmental factors. Has this interactive effect been analyzed by PTCA?

15. The Oregon DOT has stated, "(w)e have also observed that longitudinal cracking in pavements can either be environmentally or load caused... However, without heavy wheel loads, these cracks require little or no maintenance in Oregon's climate." What is your reaction to this statement?

16. In 1962, the American Association of State Highway Officials sponsored a road test that found a fully loaded tractor-trailer/semi combination did the same amount of pavement damage as it took 9,600 cars to cause. The recent DOT cost allocation study uses a ratio of approximately 1 to 18. Do you believe this is a conservative estimate?

17. In the General Accounting Office's 1979 study--Excessive Truck Weight: An Expensive Burden We Can No Longer Afford--there was an estimate that trucks run overweight more than 20 percent of the time. What are PTCA's estimates?

18. The railroads argue that they should carry loads of 50,000 pounds or more while the trucking industry continues to seek an increase in the Federal weight limit of 80,000 pounds. Is there some point at which truck weight becomes too heavy and hence a major factor in highway deterioration?

19. The Congressional Budget Office testified last month that under staff alternatives 1 and 3, "the likely impact on truck operations should be quite modest. Total trucking costs, including the costs of the driver and distribution costs, are likely to rise by between 1.4 and 1.8 percent." What are your estimates?

PRIVATE TRUCK COUNCIL
OF AMERICA, INC.
1101 SEVENTEENTH STREET, N. W., WASHINGTON, D. C. 20036

1. PTCA's 1,800 membership companies represent 1.2 million trucks. This breaks down into truck classes as follows:

969,600	pickups and vans
138,000	single unit trucks under 26,000 lbs.
45,600	single unit trucks over 26,000 lbs.
10,800	combination trucks under 50,000 lbs.
36,000	combination trucks over 50,000 lbs.

2. There should not be a significant redistribution of tax responsibility among truck classes because there is no need for it. The incremental method does not result in lighter trucks subsidizing the heavier trucks. As indicated in our August 10, 1982 statement to the Committee, we basically support plan 2 as proposed by the Committee which is based on the incremental method with some modifications.

3. Under Plans 1 and 3 submitted by the Committee, the heavier weight truck is excessively taxed. Plan 1, for example, would increase the use tax on a truck weighing over 75,000 lbs. by nearly 1,000%.

4. It's difficult to rationalize how combination trucks over 70,000 lbs. would be paying on 65% of their cost responsibility while other combinations up to 70,000 lbs. would be paying 125%. This is just too wide a margin to believe. We were sold the Interstate Highway Plan in the mid 1950's as "Interstate and National Defense Highway System" with the emphasis on "Defense". This had connotations that the design of the system would accommodate the heaviest vehicles the Army may need to move. Now we're changing our tune and saying that the heavier (up to the allowable 80,000 lbs.) trucks are the worst offenders. This is difficult to accept. The primary reason the system is deteriorating so rapidly probably lies in the fact that the sub-surface grading was not up to specifications in many instances. Engineers tell us that an additional 1" of concrete and slightly larger re-enforcing bars would have doubled the life of the system, but Congress would not go along with a 50 year design life back in the days when the program was formulated. Hindsight is 20/20, and we're paying the price now.

5. We do not agree that the current system of user fees is inequitable, and plan 2 as submitted by the Committee provides for an equitable payment of road use taxes among the various vehicle categories.

6. As stated in the previous answer, we support Plan 2 as submitted by the Committee.

7. While the percentage of cars in the vehicle traffic stream is declining, the percentage of combination trucks has remained almost flat for the last several years. We therefore do not see this as changing our support for Plan 2.

continued.................

8. We disagree with the "consumption" method used by the Department of Transportation in its cost allocation study. As indicated in our above answers we support the incremental approach with some modifications along the lines of the "consumption" method as in Plan 2.

9. We are unable to commit ourselves to the need for a "differential" between gasoline and diesel fuel. We seriously question whether a "fair" tax is one that in effect penalizes fuel efficiency.

10. Increasing only the gas tax would obviously put more of the cost burden on cars and light trucks since the preponderance of large trucks are diesel powered; private truck operators admit to a need for a fair and reasonable increase in the user tax schedule; a gas tax increase alone on cars would have to be excessive to bring in needed revenues to the highway trust fund.

11. A flat rate per truck is preferable to any type of mileage based tax. The administration of mileage based taxes would require a significant increase of manpower in the Internal Revenue Service and would add an unnecessary administrative burden to the fleet operator.

12. We advocate going ahead immediately with plan 2 - but come back later if more revenue is needed; don't operate under the notion that the perfect plan has to be put into effect now not subject to change and revision if more revenue is needed.

    We don't advocate waiting for another 3-4 years.

13. Consistent with safety, the size of vehicles should be increased to allow an increase in productivity. By its very nature, a truck is limited in opportunity for increased productivity. We support the principles embodied in S. 1402, except that the length of a single trailer should not be limited to 48' as proposed. The tractor-semitrailer combination should be set at 60' overall with no restriction on the length of the trailer. The majority of manufactured goods produced in the country today use up the available cube before reaching the maximum allowable gross weight of 80,000 lbs. The remaining states that have not yet increased their weight to 80,000 lbs. should do so to allow the free flow of commerce and conserve fuel. Doubles (twin trailer combinations) and the longer tractor-semitrailer units should be allowed on the Interstate and Primary Federal Aid highways in a uniform nationwide manner.

14. The interactive effect between loads and environmental factors is one on which we make the following observation. The "incremental" cost allocation approach which we support and upon which plan 2 is largely based measures the effect of both weather and lightweight trucks on pavement life. The "consumption" approach used by the DOT in its cost allocation study does not. We view this as a serious flaw in the DOT study. For example, the Baltimore-Washington Parkway, the Garden State Parkway in New Jersey, and the Merrit Parkway in Connecticut wore out in twenty years. Heavy truck traffic is banned on these parkways.

continued....................

15. Weather, climate, soil condition, amount of rainfall, heat, and cold all play some part in highway surface cracking. Again, proper preparation of the sub-grade, soil stabilization, and surface construction could overcome most of these problems. Once cracking begins, the constant pounding from motor vehicles of all weight classes will accelerate deterioration.

16. Our research indicates that the official 1962 American Association of State Highway Officials test itself did not include those conditions to conclude that a fully loaded tractor-trailer/semi-combination did the same amount of pavement damage as it took 9,600 cars to cause.

    Along these same lines, the recent DOT cost allocation study's use of a ratio of approximately 1 to 18 is not a conservative estimate.

17. We do not have any statistics to offer concerning the number of trucks that run overweight. Most private truck operators that constitute our membership are law abiding corporate citizens who take every precaution to operate their trucks in a lawful manner. It's our belief that overweight vehicles are primarily the owner-operator type, exempt haulers whose income is derived solely from the tonnage he can put on the truck. Another causitive factor are railroad piggyback trailers that are generally run over short mileage routes for pickup and delivery. Some shippers tend tc overload these units by not knowing the tare weight of the equipment.

18. We seek no greater weight relief than 80,000 lbs. which is reasonable and practical for today's highways.

19. Our estimates are that staff alternatives 1 and 3 will increase total trucking costs, including the costs of the driver by 2.2 to 2.7 percent.

* * * *

18 October 1982

AMERICAN AUTOMOBILE ASSOCIATION
8111 GATEHOUSE ROAD FALLS CHURCH VIRGINIA 22047 ● 703 AAA 6000 ● CABLE AMERAUTO ● TELEX 89 9485

September 29, 1982

The Honorable Steve Symms
Chairman
Subcommittee on Transportation
Committee on Environment and Public Works
United States Senate
Washington, D.C. 20510

Dear Senator Symms:

We have your letter of September 16 including additional questions relative to testimony we presented on August 10, 1982.

Attached is a copy of the questions submitted to us and our response. Also attached are two documents referred to in our response.

The first is a consultant's report on major issues which we anticipated would be addressed in the 97th Congress. It provides an unusual insight to the views of state highway department professionals regarding major issues of current interest to the members of the Committee on Environment and Public Works.

The second document is a copy of a memorandum to the undersigned from the same consultant dealing specifically with the Baltimore-Washington Parkway and its alleged early deterioration, although being used only for passenger car travel.

We thought that this questionable portrayal of the circumstances surrounding the decision to reconstruct this facility had been abandoned by advocates of heavier trucks. Its resurrection by spokesmen for the industry before your subcommittee moves us to share this information with you in the interest of clarifying the record on this issue.

We respectfully request that the list of questions, our responses and the two referred documents be included in the hearing record immediately following our direct testimony.

Sincerely,

Charles N. Brady

Charles N. Brady, Director
Highway Department

CNB:ksf
att

FOLLOW-UP QUESTIONS FOR THE AMERICAN AUTOMOBILE ASSOCIATION

1. Do you believe inadequate maintenance has contributed to the deterioration of the roads and bridges? If so, what are the reasons for inadequate maintenance?

2. The 1962 American Association of State Highway Officials Road Test found that a fully loaded tractor-trailer/semi combination does the same amount of pavement damage as it takes 9,600 cars to cause. The recent U.S. Department of Transportation cost allocation study uses a ratio of 1 to 18. Do you believe this is a conservative estimate?

3. Do you believe the "AASHTO Interim Guide for the Design of Pavement Structures" needs to be updated? Are the pavement thickness guidelines adequate for current traffic volumes and weights?

4. The American Trucking Associations recently commissioned two studies of pavement deterioration--Causes of Pavement Damage on Interstate Highways by CounselTrans, Inc. and the Effects of Truck Weights on Pavement Deterioration by the Texas Transportation Institute?

5. AASHTO, in its review of the two above studies, found that both: appear to ignore the many studies that show a strong correlation between axle applications and pavement deterioration; and (2) fail to point out that loads and environmental factors interact, one reinforcing the other, to cause pavement damage. Do these two points indicate that some damage-related approach, rather than the incremental approach, is required to allocate pavement rehabilitation costs?

6. ATA has criticized DOT's use of ESALs, stating: "A growing body of evidence reveals that ESALs are very poor predictors of pavement performance (or damage) and particularly so for adequately designed pavements." Would you agree with ATA?

7. In testimony last month, the Congressional Budget Office stated that the DOT study "represents a significant improvement over previous studies of this sort, chiefly because it has replaced the incremental method of cost allocation with a consumption-based method." Do you agree or disagree with CBO's view?

8. What is your opinion overall of the highway cost allocation study done by DOT? How valid are the study's assumptions, methodological approaches, and findings?

9. Cars are becoming smaller and lighter while trucks become larger and heavier. Also, the percentage of cars in the vehicle traffic stream is declining while the percentage of combination trucks increases. Given this, what changes, if any, do you believe should be made in the Federal road use tax system?

10. Highway engineers and pavement experts often point to the interactive effect between loads and environmental factors. Has this interactive effect been analyzed by AAA?

11. Some of the States presently impose a differential gasoline and diesel fuel tax. The DOT study, and also AAA, suggest that consideration be given to such a fuel differential at the Federal level. You have recommended provision for a rebate to light vehicle owners. What administrative problems might that pose and how might they be resolved?

12. What effect would increasing only the Federal gas tax have on the equitable distribution of costs among the user classes?

13. The truck size and weight issue is before a number of State legislatures as well as Congress. What do you see as the major considerations in any proposal to raise size and weight limits?

14. The Oregon DOT has stated, "(w)e have also observed that longitudinal cracking in pavements can either be environmentally or load caused... However, without heavy wheel loads, these cracks require little or no maintenance in Oregon's climate." What is your reaction to this statement?

15. There has been frequent reference to the Baltimore Washington Parkway as an example of a highway that is deteriorating despite the absence of truck traffic. AASHTO testified last month that a highway's service life is finite. Since the B-W Parkway is 22 years old, can it be argued that it has, in fact, lasted its intended service life or do you believe that environmental factors are more to blame?

16. It has been said that toll roads could better match rates to actual road costs. What is your position on toll financing of highways?

17. At what point does the road damage and deterioration become so severe as to constitute a major, national problem? How large-scale are the highway inffastructure needs at present?

AAA RESPONSES TO QUESTIONS
INCLUDED IN SENATOR SYMMS' LETTER
OF SEPTEMBER 16, 1982

# 1 There is no question but that inadequate maintenance has contributed to the deterioration of roads and bridges. Inadequate budgets for road maintenance is most frequently cited as the root cause. However, inadequate management controls and a host of other factors contribute. They range in scope from failure to carry out routine painting of bridges to legislative failure to recognize the accelerated deterioration caused by ever-increasing axle loads and frequency of heavy axle loadings in the traffic stream.

# 2 This is a difficult question to answer because the 9600 car to heavy truck relationship does not relate to the 1 to 18 figure.

The 9600 car to heavy truck relationship is a one on one situation that is not found on the road. The State of Tennessee looked at this comparison in 1980 and found that "the distribution of trucks in the traffic stream, the number of trucks in the right hand (design) traffic lane, and the variation in truck weights result in a much lower actual ratio of impact (car versus trucks)". The study then cited an example of an actual section of rural Interstate and concluded, "The overall ratio is 570 to 1."

The 1:18 ratio mentioned in the question apparently is derived from the $ per 1000 vehicle miles traveled table on page VI-42 of the study. This shows that combination vehicles of over 75,000 lbs. GVW have a cost responsibility of $6.20/1000 miles and autos $0.34/1000 miles for each $1 billion of program. This table is designed to show overall cost responsibility and not just the cost responsibility for pavement, and to show it on a per 1000 miles of travel basis rather than total cost. Total cost would vary with the total miles traveled and the total magnitude of the program. For example, with a $10 billion program the cost responsibility of a passenger car traveling 10,000 miles per year would be $3.40/1000 miles x 10,000 miles, or $34.00. That of a 75,000 lb. GVW combination traveling 100,000 miles per year - $62/1000 x 100,000 miles or $6200. This factors out to a little over $.06 per mile of travel for the heavy truck, which is probably about right in terms of cost responsibility.

# 3 AAA has no staff qualified to make a judgment on the adequacy of the AASHTO standards so we would have to rely heavily on the evaluation of those who have used these standards in their professional careers.

From a report made to AAA by Henrik E. Stafseth in March of 1981, some 45 of 48 contiguous states believed that the AASHTO Road Test findings confirmed the life experience of their state highway systems. Two states believed that the equivalence factor found in the AASHTO Interim Guide for the Design of Pavement Structures had to be adjusted to meet the traffic conditions of their state. (See question #17 of attached report).

#4&5 To a certain extent the two studies submitted by the ATA appear to reach contradictory conclusions. We would agree with the AASHTO conclusion that there is an interaction between environmental damage and load-related damage. The state of present knowledge doesn't permit a neat deliniation between the two. The State of Oregon has allowed a 10 percent factor for environmental deterioration, down from 20 percent in an earlier Oregon study. About 30 percent has been allowed in the Federal Cost Allocation Study. Maryland used a 20 percent factor. We expect that ongoing research on this subject will eventually result in a factor between 10 percent and 30 percent, depending upon environmental conditions of the individual states. We have serious reservations about the TTI technique of extrapolating a very limited set of conditions in such a manner as to apply nationwide.

We fully concur that a damage related, rather than the incremental approach, is essential to a fair attribution of pavement rehabilitation costs.

6 The "growing body of evidence" to which ATA refers appears to be limited, at this time, to findings of studies which ATA has financed. And even those are clouded by contradictions. If ESALS are a poor predictor of pavement performance, as ATA alleges, then all pavement design for the last 30 years has been deficient. Estimates of ESAL applications are used in all pavement design considerations as an essential element in determining required pavement strength. The commonly used "20-year design life" of new highways is directly related to the time period during which the requisite number of ESALS are predicted to be accumulated that will reduce the pavement service index (PSI) to the level where resurfacing or reconstruction is warranted. It is not uncommon for 90 percent or more of the total ESALS to be attributed to vehicles in excess of 6000 lbs. GVW. That is one of the reasons why the consumption approach, rather than the incremental approach, is the more valid for allocating pavement rehabilitation costs.

It is also important to note that the effect of ESALS on pavement structures is not constant. As pavements get older the same ESAL has a more pronounced impact. With axle weights getting heavier and pavements getting older, the combined effect presents serious problems in the near term.

7 We agree with CBO's view for the reasons stated in response to #6.

8 We believe that the highway cost allocation was well done. While we believe that, in some respect, choices of allocators were biased in favor of heavy trucks, in the main the study achieved a balance superior to that of previous studies. We agree with most of the methodology used, and the resultant findings seem to be consistent with findings of other studies recently reported by the states.

9 The change in relative vehicle sizes has important ramifications for the road use tax system. Smaller passenger cars will impose less demands on the highway system, bridges, lane width, etc. With trucks

getting heavier, wider, and longer, and with their vehicle miles of travel (VMT) expected to increase at a much faster rate than passenger cars, the relative proportion of capital investment needed to service their needs is increasing. This highlights the need to adjust the user tax system so as to reflect the higher costs occasioned by these growing needs of the heavier class vehicles. There are also important but as yet unquantified safety implications of this increasing disparity in sizes as between vehicle classes which could further affect costs.

#10 AAA has not analyzed the interactive effect between loads and environmental factors but we understand that FHWA is currently engaged in relative studies in conjunction with pavement long-term monitoring activities.

#11 AAA favors a diesel differential tax on the basis that diesel vehicles attain significantly higher miles-per-gallon rates than similar vehicles powered by gasoline engines. We have suggested that rebates be made to light vehicle owners only because payment of a truck diesel differential tax by passenger car operators would result in an overpayment of cost responsibility. Because diesel fuel and home heating oil are interchangeable, the same method of tax collection as used for gasoline apparently cannot be used. We see no more difficulties in administering such a rebate program than that now encountered in rebating fuel taxes paid for farm use, taxicabs, transit buses and off-highway use of other highway vehicles.

#12 Increasing only the gas tax would have the effect of placing some 85 percent to 89 percent of the additional tax burden on light vehicle owners. Heavy vehicles would thus underpay their cost responsibility by an even greater margin than found to be the base case in 1977. Table VI-II of the cost allocation study found that vehicles over 75,000 lbs. GVW paid only 45 percent of their cost responsibility in 1977.

#13 On size and weight we see the need to settle, once and for all, the maximum size and weight of vehicles that will be permitted to move over the federal-aid highway systems. Not until this issue is settled will highway officials be in a position to know how strong to build the pavements and bridges, how wide to build the travel lanes, the radii of curving alignments, length of merging lanes, etc. Failure to achieve such an important policy agreement has led to an accelerated deterioration of huge capital investments made to accommodate vehicles of a particular size and dimension, only to be subjected to an entirely different set of vehicle parameters once put into service. We can no longer afford the waste associated with such a lack of legislative direction.

In order to achieve an equilibrium, relative to the dimensions of the highway plant and dimensions of the vehicles using it, the traditional custom of grandfathering larger sizes or heavier weights must be abandoned. Special permit vehicles should continue to be allowed but only for carrying indivisible loads over assigned routes.

Of course, increases in sizes or weights should be accompanied by increases in taxes on heavier vehicles commensurate with the additional costs they occasion. AAA greatly favors a weight distance tax which more nearly reflects the extent of highway use than existing excises on the vehicle purchase price or the use tax for all vehicles over 26,000 lbs.

#14 There seems to be general professional agreement that heavy wheel loads cause additional distress where cracks are already present.

#15 We don't believe that environmental factors are to blame for the reconstruction now being carried out on the B-W Parkway. As the attached memo from Henrik E. Stafseth, dated January 9, 1981 notes, the Parkway has been subjected to traffic other than passenger car traffic, including military traffic, airport buses, and an undetermined amount of illegal use by prohibited vehicles.

A 1976 report by the Transportation Laboratory of Caltrans indicated that the Arroyo Seco Freeway which is limited to passenger car travel required no structural pavement overlays in 35 years. Yet similar pavement on Route 99 in the San Joaquin Valley serving mixed traffic required several overlays during the same period. The report noted: "It was found that an average of 66 percent of the total thickness of pavement needed at the Route 99 locations was required to handle the heavier loads imposed by trucks and buses (gross loads greater than 6,000 lbs.)."

#16 The American Automobile Association believes that toll road financing is one of the most expensive methods of building highways. Not only do interest and toll collection costs have to be added to the construction cost but the service provided to communities located in the toll corridor is frequently dictated by the revenue generation potential of interchanges to serve them, rather than the mobility requirements of their residents.

Depending upon the toll rate per mile of travel (usually 1.5 cents to 2 cents per mile) the 20 miles per gallon passenger car driver will pay the equivalent of 30 cents to 40 cents per gallon of fuel tax exclusive of existing state and federal fuel taxes. Because toll facilities are commercial ventures, business marketing practices usually result in toll rate reductions for frequent commercial users. These practices frequently result in large heavy trucks paying a toll rate of only two or three times that paid by passenger cars. Such a rate differential is far below the relative pavement cost responsibility of these vehicles and the passenger car operator thus heavily subsidizes the heavy truck operator.

#17 There seems to be general agreement among highway-oriented professionals that the nation is already confronting a major problem in the deterioration of its road system. There is significant support for proceeding with a well-reasoned program for rehabilitation of our highway plant. The last official report of DOT, "The Status of the Nation's Highways:

Conditions and Performance - 1981" revealed that between 1975 and 1978 pavement on the Interstate listed as "good" deteriorated from 72 percent of the mileage to 62 percent. Pavement listed in "poor condition" increased from four percent to nine percent. Pavement on other federal-aid roads experienced similar deterioration. A new report is due early in 1983. The full extent of the rehabilitation needs of the 1980's won't be available until that time.

REPORT TO AMERICAN AUTOMOBILE ASSOCIATION
ON
HIGHWAY COST ALLOCATION AND USER TAXATION
BY
HENRIK E. STAFSETH
MARCH, 1981

In response to your request, I have looked into highway cost allocation and user taxation and the reactions of highway professionals in the 48 contiguous states to policy issues which will be before the U.S. Congress in 1981 through 1982.

I contacted high ranking highway officials in each of the 48 states. These officials were either the highway directors, chief engineers, or the professionals with the best knowledge of cost allocation principles.

This survey was conducted by telephone interview during the months of December 1980 and January 1981. Survey results show significant support for the view that the Highway Trust Fund balances should be reduced prior to efforts to increase revenues; that more emphasis should be placed on axle weight and frequency in the determination of user tax schedules; almost unanimous support for the findings of the AASHTO Ottawa Road Test in determining life expectancy of highways when subjected to axle loadings of various magnitude; and the intent of practically all states to use the findings of the federal cost allocation study in state activities. Survey questions and the state responses are attached as appendix to this report.

ISSUES RELATING TO USER TAXATION

Highway officials were unanimous in their support to a long-term extension of the Highway Trust Fund and a reduction of current balances in that fund to a level that it support a cash flow method of accounting for the Trust Fund.

Over 85% of state highway department professionals queried expressed the view that trucks as a class are not paying a fair share of user taxes, based upon benefits received. Respondents in 31 states singled out large trucks as paying the least fair share.

Indicative of the seriousness with which underpayment of highway user taxes by heavy trucks is viewed by those responsible for building and maintaining the nation's highways is the almost unanimous support for the establishment of a user tax system which would take into consideration both the number and the weights of axles using the highways. Forty-five states indicated they would favor such a user tax. Thirty indicated they would favor a federal weight-distance tax for trucks.

ISSUES RELATING TO HIGHWAY COST ALLOCATION

There is a growing fear among highway officials that increased axle loadings permitted in recent state and federal laws have been counter-productive. Highway professionals' opinion is that the weight and travel frequency of heavy trucks cause the greatest wear to our highway system. Their experience and observations conclusively support the results of the AASHTO Ottawa Road Test findings, which indicate a progressive increase of highway wear is occasioned by the increase of truck weights. Forty-five states indicated that the AASHTO Ottawa Road Test findings have been confirmed by the life expectancy of their state highway systems. This almost unanimous confirmation of AASHTO Ottawa Road Test findings by state highway professionals lends solid statistical evidence to the reliability of the AASHTO pavement design standards as they relate to highway wear associated with weight and frequency of axles.

Based upon AASHTO Ottawa Road Test axle load equivalencies, a small reduction of axle loadings can extend the life of our pavements significantly. For example, a reduction of the federal axle load limits to the before-1974 basis could be expected to increase the life expectancy of Interstate highway pavements by approximately 25%. For pavements of lower design standards, the increase in life expectancy would be even greater. A practical way to accomplish such a program would be to create a tax incentive to encourage the distribution of the current loadings over more axles. Such a program has been used successfully in the State of Michigan.

Deteriorated highways exact a fuel penalty for all users and in some instances cause damage to the vehicles. A soon-to-be-released study of The Road Information Program reveals that each driver today is losing $184 per year as a result of the poor condition of our highways. Appromixately 56% of this loss is attributed to additional fuel costs. This is a serious energy loss and when coupled with the high energy costs of Portland Cement concrete, asphalt, and reinforcing steel necessary to repair and upgrade these roads it soon becomes apparent that extending the life of our existing highway pavements makes a good deal of economic and energy sense.

Two of our western allies, Norway and France, have just experienced axle weight reduction by national government action so there is precedent to guide us. These actions undoubtedly were brought about because of concern over energy waste as well as a desire for longer highway pavement life.

In the Federal Highway Administration's Working Paper #9, "Federal Highway Revenue and Highway Cost Allocation Options," three options of assigning costs were outlined. Forty-two respondents selected option #2 as their preference. Option #2 shifts a greater tax burden from light to heavy trucks, using the AASHTO pavement equivalence factors as a basis for a progressive tax charged to the heavier vehicles. Some 30 states favored the allocation of common costs on the basis of passenger car equivalents (PCE) weighted vehicle miles traveled rather than vehicle miles traveled (VMT). This is an important element in option #2.

Twenty-five states reported shortened design life occasioned by the increased use of heavy trucks on their Interstate highway systems. Thirteen states indicated a loss of five years or more in design life.

The destruction of highway pavements directly attributable to heavy axle loadings is borne out by the experience of the Virginia Department of Highways and Transportation. Several years ago Virginia permitted coal trucks with loadings of 24,000 lbs. for single axles, 45,000 lbs. for tandems, and 50,000 lbs. for tri-axles in three southwest counties. The highway department has compared highway maintenance costs with similar counties where legal loadings were held to 20,000 lbs. for single axles and 34,000 lbs. for tandem axles. Its report to the General Assembly noted "In the three counties where the higher axle weights were allowed, annual surface maintenance costs are approximately 280% higher on the Primary System and approximately 340% higher on the Secondary System than in other typical counties."

Another southern state has conducted its own mini road test by measuring pavement damage, before and after, at a permanent weigh station site as compared to a pavement section adjacent to the weigh station. The state had accurate data of traffic repetition by classes of vehicle so it could compare heavy axle application and its effect on highway life in the three measured sections of highway. It found that there was a significant difference in the pavement condition approaching and leaving the weigh station as compared to that adjacent to the station. This difference confirms the fact that heavy axle loadings reduce the life of pavements. Pavement performance supported the anticipated design life projected by this highway department when it designed this section of pavement using the AASHTO pavement design procedures.

The increased frequency of heavy vehicles in the traffic stream as well as the increased weight of the axles of these vehicles results in accelerated deterioration of pavement condition. State officials are concerned about the great increase in the number of trucks in the traffic stream over the past 20 years. Compared to automobiles, forty states reported that trucks experienced the greatest growth in the number of vehicles in that time frame. Twenty-seven states identified large trucks as the type of vehicle which experienced the greatest growth rate.

Highway departments are universally interested in the findings of the federal cost allocation study. Forty-six states responded that they were awaiting the results of the federal cost allocation study. Some 30 states indicated that they were preparing their own cost allocation studies. Many are awaiting the results of the federal study before finishing their studies. The fact that so many states responded positively to this question indicates widespread concern for equity in cost allocation of highway user taxes.

HES:ksf
3/12/81

RESPONSES OF
HIGHWAY PROFESSIONALS IN FORTY-EIGHT CONTIGUOUS STATES
TO
AAA COST ALLOCATION AND USER TAX INQUIRY
DECEMBER 1980 - JANUARY 1981

1. Would you support the extension of the Highway Trust Fund until the year 2000 A.D., which would allow the federal government to reduce the current Trust Fund balance to a more realistic level?

Yes 48 No 0

The professionals unanimously expressed a concern over the large balance in the Highway Trust Fund. They felt it should be reduced to a minimum level that would support cash flow.

2. Would you support a draw down of $3 billion/year for three years of the Highway Trust Fund, giving time for an adequate review of the Federal Cost Allocation Study and then propose a new Federal-Aid Highway Tax Program for Congressional consideration in 1983?

Yes 41 No 6 Pass 1

Highway officials supported the AASHTO legislative position of $1 billion/year reduction plus a doubling of highway taxes; however, 41 state officials recognized AAA's proposal (question 2.) as an excellent backup proposition.

3. Do you feel the Federal Cost Allocation Study should comtemplate only those items stated in the Surface Transportation Assistance Act of 1978 which were the costs associated with highway design, construction, rehabilitation and maintenance, and not the additional issues of social or environmental concerns as being suggested by FHWA?

Yes 40 No 7 Pass 1

The small minority opinion generally followed the premise that if additional costs were caused by social and/or environmental concerns, then their costs should be a part of cost allocation.

4. Should all common costs be allocated on the basis of passenger car equivalents (PCE) weighted vehicle miles traveled rather than vehicle miles traveled?

Yes 30 No 17 Pass 1

Most of the state officials that were not in support of this concept were from states with low population.

5. Which of the three methods of highway cost allocation described in FHWA's "Federal Highway Revenue and Highway Cost Allocation Options" Working Paper #9, dated August 1980, would your state prefer?

Method #1 2 Method #2 42 Method #3 4

The large majority of professionals supported shifting a greater tax burden from light to heavy trucks using the AASHTO Pavement Equivalence Factors as a basis for a progressive tax charged to the heavier vehicles.

6. Do you support the occasioned cost of one foot to every 12 ft. travel lane width as well as two feet of the shoulder width being allocated to large vehicles?

Yes 23 No 23 Pass 2

The highway officials were evenly divided on this issue; the opposer group felt that width should be a common cost instead of an occasion cost, because of the safety benefits to all vehicles.

7. What design requirements should constitute the "basic bridge" as a common cost?

H-5 17 H-15 31

The majority supported the H-15 basic bridge because it represents the minimum design standard currently used on low volume roads. The minority recognized the theoretical occasion cost using a H-5 basic bridge.

8. Would you favor a highway user tax that reflects the number and weight of axles using the highway system?

Yes 45 No 3

This near unanimous support provided evidence of a strong desire for establishing a user tax based on the number and weights of axles.

9a. Does your state use a declared gross weight taxing system for commercial vehicles?

Yes 45 No 2 Pass 1

9b. Does your state use a visual means of identifying licensed gross weight of commercial vehicles?

Yes 27 No 19 Pass 2

The advantages of a gross weight taxing system is strongly supported, however, a lesser number of states require visual identification which causes a handicap for the enforcement officers.

10a. Would you favor the implementation of a federal weight distance tax for trucks?

Yes 30 No 17 Pass 1

10b. Would you favor using a graduated weight distance tax that is proportional and/or similar to the Pavement Equivalence Factors developed by the AASHTO Ottawa Road Test Findings?

Yes 32 No 13 Pass 3

Several states opposed this tax, fearful of preemption by federal government. The remainder were concerned with additional involvement as a result of federal law.

11. Would you support a diesel differential tax rate for commercial vehicles?

Yes 29 No 18 Pass 1

The substantial minority felt the diesel differential tax conflicted with the national energy saving goals.

12. Which of the following vehicle classes do you feel is paying the least fair share of the user taxes based on benefits received?

Automobiles 2 Motorcycles 3
Small trucks, less than 50,000# 4
Large trucks 31 All trucks 6
No opinion 2

The response generally supported the Federal Cost Allocation Study observations.

13. What classes of vehicles had the greatest growth in number as compared to the automobile growth for the past twenty years?

No change 1
Motorcycles 1 All trucks 11
Small trucks, less than 50,000# 2
Large trucks 27 Buses 0
Pass 6

The states indicating an increase of truck population had an average increase of from 50% to 100% over the automobile growth. One state experienced the greatest growth of six times for trucks over the automobile. The six passing states had no data, thus no comment.

14a. Has or is your state preparing its own highway cost allocation study?

Yes 30 No 18

14b. Do you intend to use the findings of the Federal Cost Allocation Study for your state?

Yes 46 No 1 Pass 1

The fact that 46 states responded positively to this question indicates strong concern for equity in cost allocation of highway taxes. It was noted that a majority of the positive responding states were awaiting the Federal Cost Allocation Study results before finishing their study.

15. Could you estimate the shortened design life occasioned by the increased use by heavy trucks on a section of the Interstate Highway System in your state?

No effect - low volume 15
Some effect 12
Five-year loss of design life 4
More than five-year loss of design life 9
Pass 8

The states with low volumes of truck travel experienced little difficulty. The states with heavy truck traffic volumes, such as heavily populated or cross-over states, experienced from slight to serious damage on parts of their Interstate Highway System.

16. Has your state been involved directly in the FHWA Cost Allocation Study?

Yes 28 No 19 Pass 1

The high percentage of state involvement in the Federal Cost Allocation Study indicates the thoroughness of the federal government's part.

17. In your work, do you feel that AASHTO Ottawa Road Test findings have been confirmed by the life experience of your state highway system?

Yes 45 No 2 Pass 1

The almost unanimous confirmation by the state highway professionals of the AASHTO Ottawa Road Test findings lends further credible evidence of the reliability of the AASHTO Pavement Design Standards. The two states indicating a negative response were not in conflict with principles established by the Road Test, they felt that AASHTO Pavement Equivalence Factors had to be adjusted to meet the traffic conditions in their state. Several bridge professionals expressed concern that heavy axles were a major contributor to the bridge deck failures.

18. What is your opinion as to a periodical time frame for review of the Federal Cost Allocation Study in the future?

Interval of four years 22
Eight years 24
More than eight years 2

The states were in favor of the next Federal Cost Allocation Study being conducted within eight years.

HES:ksf
3/10/81

January 9, 1981

TO: CHARLES N. BRADY

FROM: HENRIK E. STAFSETH

RE: JOHN L. REITH, ATA, STATEMENT AT SUBCOMMITTEE ON SJR50 STUDY COMMITTEE, RICHMOND, VA., DECEMBER 17, 1980

The Baltimore-Washington Parkway was built as a Defense Highway and turned back to the Park Service. Thus, the Defense Department uses the facility and it should be noted that many of their vehicles are very heavy and carry heavy loads.

In Mr. Reith's statement he cites only a few buses use the Parkway. It should be noted that there is fairly heavy bus schedule from Washington, D.C. to Baltimore-Washington International Airport. The over-the-road bus has axle weight of greater than 20,000 lbs. and several states were obliged to pass legislation to give these buses special axle weight consideration. In my investigation I have learned that Brinks' armored trucks, U.S. Mail trucks, maintenance dump trucks and finally that great variety of trucks drive this parkway during the late hours apparently when the patrolling officers are least likely to be present. It should be remembered that Maryland has permitted the 22,400 lb. single axle and 36,400 lb. tandem axles. The impression that the U.S. Park Service parkway only serves the automobiles and only a few buses is very doubtful.

In 1969 the Maryland Highway Department made a thorough investigation of the Baltimore-Washington Parkway, including borings of the pavement, soil boring, joint fault count, etc.

The as built results of the U.S. Park Service section was generally a 8" Reinforced Concrete Pavement (RCP) with an 11" select base material. It had no evidence of any load transfer joint dowels which was evident because of the two to three times greater number of joint faults than the Maryland section. It was also witnessed by the investigators that the slabs tipped or pumped when an over-the-road type bus traveled over the Parkway. The pavement slabs were assessed as generally being in good shape.

The Maryland section results indicated a 10½" RCP with a 12" select base material with load transfer joint dowels and of course much better pavement joint experience and their pavement slabs were in good shape.

The Maryland I-95 section adjacent to the Parkway is a 48' four-lane pavement in each direction with 9" RCP with select base material for the two interior lanes and 10" RCP, extending two additional feet into the shoulder area, with select base material for the two exterior lanes of the roadway. The two exterior lanes are the right hand truck lanes.

Mr. Reith's statement "Yet the highway (Baltimore-Washington Parkway) was designed to standards practically the same as nearby Primary and Interstate highways" is somewhat misleading.

It should be remembered, the Park Service section of highway still serviced 22 years which met its design life objective. The Maryland section has been 20 years in service and structurally is a much stronger pavement.

The Maryland section has no prohibition for truck traffic and according to the AASHO Test Road finding would support 10,000,000 applications of a 24,000 lb. single axle whereas the Park Service section would be a bit shy of supporting the same number of applications for an 18,000 lb. single axle.

The state highway departments have operated 70 plus years and I have been associated with the program 40 years at different levels of government and have been well informed of my predecessors' works. I have never heard, seen or read of any information that supports Mr. Reith's statement "Pavement costs are in no way directly proportioned to equivalent loads. In fact, all engineering evidence shows just the opposite. Pavements are not consumed, or do not deteriorate directly in proportion to vehicle weights." All of the information I have learned or experienced has been contrary to his statement.

As a result of my survey, all of the State Highway Officials and Engineers of the 48 contiguous states were emphatic in their professional opinion that the heavier a vehicle the greater wear or life of a pavement. They were unanimously supportive of the principles developed by the AASHO Ottawa Test Road.

The AASHO Road Test, completed in 1960, showed that the damaging effect of vehicles on pavements was approximately proportional to the fourth power of the axle load. Stated more simply, the heavier the load per axles the greater loss of design life or wear of the pavement.

Pavement bends like you can bend a paper clip, and after so many bending applications the pavement, like the paper clip, will break. The more vigorous you make the bends, the faster the failure of both examples.

AASHO first published its Interim Guide for Design of Flexible Pavement Structures in 1962. The following year AASHO published Interim Guide for the Design of Rigid Pavement Structures. Both publications were based on the findings of the AASHO Ottawa Road Test and the research and experience accumulated by the state highway departments. AASHO pavement design formulas have been developed by large quantities of statistical information and experience. There has been sufficient time to date to verify the performance of these formulas and they are recognized world wide. As a result, the AASHO publication based on the Ottawa Road Test and AASHO experiences are used and recognized internationally as the world's leading source of highway and pavement design.

The subject of the effects and damage caused by heavy loads on pavements has been practically an annual assignment for each state highway department to report to each legislative session in each respective state. In addition, there are many other reports from very reliable sources - to name a few: U.S. General Accounting Office, entitled "Excessive Truck Weights, An Expensive Burden We Can No Longer Support", Congressional Budget Office, U.S. Congress "Who Pays for Highways: Is a New Study of Highway Cost Allocation Needed?", and Transportation Research Board Report #725 " Pavement Systems: Assessment of Load Effects on Design and Bases."

HES:ksf

Center for Auto Safety

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(202) 659-1126

October 15, 1982

Senator Steven D. Symms, Chairman
Subcommittee on Transportation
Committee on Environment and Public Works
Dirksen Senate Office Bldg. 4202
Washington, DC 20510

Dear Senator Symms:

The Center is pleased to provide you with its responses to your series of questions transmitted to us on September 16, 1982. We hope that you will find our answers to be of use in the Committee's deliberations on highway legislation. If you need any additional information relevant to these responses, we would be happy to provide it. In addition, any other material or views on other aspects of the highway program are available to you at any time.

FOLLOW-UP QUESTIONS FOR THE CENTER FOR AUTO SAFETY

1. *Cars are becoming smaller and lighter while trucks become larger and heavier. Also, the percentage of cars in the vehicle traffic stream is declining while the percentage of combination trucks increases. Given this, what changes, if any, do you believe should be made in the Federal road use tax system?*

We cannot make recommendations at this time due to the fact that, for example, the recent FHWA Cost Allocation Study inadequately considers important externalities in calculating road-use costs for different vehicle classes, thereby compromising judgments on the equitable distribution of user-fee burdens. As a result, no study has adequately assessed and quantified all relevant benefits and disbenefits, including externalities such as accident costs, for different vehicle classes which could allow such judgments to be made and adequately defended.

2. *Has the Center for Auto Safety reviewed the recent DOT study, Investigation of Truck Size and Weight Limits? If so, what is your opinion of the study's recommendations?*

We have made a brief evaluation of the study. Our opinion is that it appears to contain considerable self-fulfilling prophecy. In addition, the evaluation of pavement damage by trucks is inadequate inasmuch as it addresses only surface damage, whereas the extent and rate of pavement base and sub-base damage is equally, if not more, important. This is expecially true for scenarios which involve increased diversion of heavy vehicle traffic to the older non-Interstate Primary System whose structural integrity is, in many instances, considerably less than that on the newer parts of the Interstate System.

(more)

The upshot is that, without adequate measurement of the destructive effect of differing loads on pavement bases and sub-bases as compared with the environmental degradation of these underlying pavement structures, it is impossible to draw conclusions as to the proportion of pavement surface damage created by heavy trucks as against that created by environmental factors.

3. *The truck size and weight issue is before a number of State legislatures as well as Congress. What do you see as the major consideration in any proposal to raise size and weight limits? How much is safety a concern?*

Safety is a very great concern, particularly with regard to heavy-vehicle use of older, non-Interstate Federal-aid highways which have narrower lane widths (less than twelve feet); poorer superelevation; poorer sight distance, especially passing sight distance; excessive curvature; poor skid resistance; and narrow or non-existent shoulders for refuge and recovery zones. In addition, serious consideration must be given to the mismatch of large trucks, particularly on older two-lane roads, with very small vehicles whose acceleration capabilities for passing and entering partially controlled and uncontrolled access highways are very poor. Lastly, the safety engineering of almost all roads presently disfranchise very heavy vehicles from nearly all forms of protection from hazards when heavy vehicles leave the roadway proper. Guardrail, bridge railings, and even many concrete barrier systems, as one area of example, cannot successfully contain and redirect present 80,000+ lbs. trucks. Larger and heavier vehicles, in sum, will unerringly lead to significantly higher single- and multiple-vehicle accidents, as well as increase the extent and rate of structural damage on roads, particularly on the non-Interstate Federal-aid systems which already are being insufficiently and improperly rehabilitated in many states through the use of Federal-aid funds pursuant to 23 U.S.C. § 101(a).

4. *Has the Center for Auto Safety reviewed the Highway Cost Allocation Study recently completed by DOT? If so, how valid do you believe the study's assumptions, methodology, and findings to be?*

The Cost Allocation Study (hereafter, the "Study") is an unrealistic assessment of all costs society bears as partitioned by type of travel (urban vs. rural) and vehicle class. The result is that the study inadequately evaluates the user fee burdens to be supported by each major vehicle class and for rural as opposed to urban users. For example, the issue of accident costs and experience for each vehicle class is not quantified and included as an "externality" in the study. Even the Director of the study, Anthony Kane, has acknowledged that the study has not adequately assessed all relevant costs and benefits. As discussed above, heavier vehicles suffer a disproportionately large accident experience (the Center requested a FARS printout on this which had never been done before; we include it as an attachment), but, in contrast, are provided the poorest engineering treatment for adequate protection against hazardous highway events (at the opposite end of the weight/size scale, this is also true for motorcycles).

Similarly, rural users suffer a much higher fatality and serious injury rate than urban users. Yet the study concludes that rural users are getting more than their fair share of benefits from the user fees they pay. This is myopic.

(more)

The Committee should note that the famous Hartunian and Smart article in the December 1980 American Journal of Public Health calculates the cumulative costs to society for highway losses to be surpassed only by the societal costs due to losses by cancer. Yet this "externality" is excluded from the Cost Allocation Study, whereas air pollution and congestion are included.

The result is a study artificially abbreviated in scope and of limited usefulness.

5. *What do you believe the major cause of bridge and road deterioration to be?*

Systematically deferred maintenance by the states, especially on the older, non-Interstate FAP, FAS, and FAU systems combined with accelerated damage due to a lack of accomodation of increased traffic loads.

6. *Do you believe inadequate maintenance has contributed to the deterioration of roads and bridges? If so, what are the reasons for inadequate maintenance?*

The states pursued the new construction programs, particularly the Interstate, as against the maintenance and upgrading of the older Federal-aid highways. After twenty years of deficient highway planning and funding for these older highways, the states suffered severe revenue shortfalls beginning in the early seventies. The states asked the Congress for, and received, the R-R-R bailout of 1976.

The states' failure to observe their 23 U.S.C. § 116 maintenance obligations has been condoned by the lack of enforcement by the FHWA whose Division Administrators continue to certify the states as meeting § 116 despite Annual Maintenance Reports showing massive and persistent failure in most states to properly maintain the Federal-aid roads.

7. *What specific safety concerns do you have with deteriorating highway facilities? What kinds of problems do motorists face in driving on roads which are considered in poor to fair condition?*

Older highways frequently have defective, out-of-date geometry, poor skid resistance, and roadsides littered with fixed-object hazards and other dangerous conditions. Oftentimes, simple resurfacing without commensurate geometric upgrading and roadside safety work causes these older roads to become even more dangerous due to the typical increase in travelling speeds induced by the new, smooth riding surface. Perpetuating antiquated, substandard geometric design in most instances ensures continuing high accident experience and fails to anticipate and meet probable future service demands. The least of all safety problems on deteriorating highways is potholes, although they do cause loss of productive time, mechanical damage, and fuel waste.

8. *How much of pavement wear is due solely to environmental conditions and how much seems to be an interactive effect between loads and environmental factors?*

(more)

No generalization is possible. The ratio depends entirely on climate interacting with the character of the roadbed which, in turn, is strongly determined by soil characteristics and other governing factors, as related to the quantity and frequency of travel loads. For example, more environmental deterioration of roads takes place in, say, southern Louisiana than in many lower mid-western and mid-South areas. In such a case, environmentally compromising features of the road help to accelerate damage done by heavy, concentrated axle loads.

It should be clearly understood that much heavy loads damage is due to inadequate design of the pavement substructure. When many jurisdictions became aware of the demand levels present and anticipated for many inferior roads, they nevertheless did nothing to upgrade the structural integrity of these highways to accomodate the service that was required. Many still aren't. The combination of the predominant approach of the R-R-R program off the Interstate -- simple resurfacing -- will exacerbate the problems with heavy vehicles in the near term.

9. *The 1962 American Association of State Highway Officials Road Test found that a fully loaded tractor-trailer/semi combination does the same amount of pavement damage as it takes 9,600 cars to cause. The recent DOT cost allocation study uses a ratio of approximately 1 to 18. Do you believe this is a conversative estimate?*

The 1962 AASHTO Test had so many uncontrolled variables and so much methodological impoverishment that it is disgraceful for anyone even to rely upon this study any more. The DOT Study figure of 1 to 18 is Pythagorean numerology.

10. *The DOT cost allocation study found that in 1985, under the current tax system, autos will pay 100 percnet [sic] of their cost responsibility while heavy combination trucks will pay only 65 percent. What actions should be taken to better match cost assignments with cost responsibilities for all vehicle classes?*

See our answers to Qs. 1, 2, 3, and 4 supra.

11. *At the August 10, 1982 hearing, Mr. Donaldson suggested that there be at least a doubling in highway user fees. Did he mean a doubling of all the current excise taxes or only the motor fuels taxes? Please comment on the three alternatives developed by committee staff.*

He intended only motor fuel taxes doubling, although we would support increases in other user fee areas, such as excise taxes on parts and tires.

As far as Committee options go, we favor selected elements from each of the three scenarios. See attached copy of Committee options with circled elements we support.

12. *What effect would increasing only the Federal gas tax have on the equitable distribution of costs among the vehicle classes?*

(more)

The change would disturb the status quo which has no available rationales for defending the present proportions and distribution of user fees. Many would cry inequity, however, because the word can successfully be used as a cudgel. A consideration is that the present gas tax of 1959 is the most under-assessed user fee in the entire rate structure, notwithstanding the present concentration on heavy truck fees.

13. *Some of the States presently impose a differential gasoline and diesel fuel tax. The DOT suggests that consideration be given to such a fuel differential at the Federal level. What is your view of such a proposal?*

If this means that diesel is charged a higher rate, this can be argued as inequitable (and will be by many advocates). Penalizes increasing passenger-car use of fuel-efficient diesels. On the other hand, much larger numbers of private passenger cars with present diesel technology are not desirable due to environmentally unacceptable diesel pollution, especially particulates.

The solution is that if you want the trucks to pay more for diesel, put in a 26,000 lbs. threshold for the diesel tax -- over 26,000 lbs. one pays the higher diesel tax rate, below that one pays the same rate as gasoline. (It cannot be ignored, however, that this may promote certain alterations in the make-up of the vehicle fleet in order to take advantage of lower fuel costs for trucks under 26,000 lbs., ceteris paribus and given prevailing or manipulable economies of scale in commercial hauling.)

14. *The American Association of State Highway and Transportation Officials as testified about States' difficulties in meeting the costs of highway maintenance, not only on the Interstate and bridges, but also on the urban and secondary system* [sic]. *What do you believe the States can do to enhance their ability to finance their share of these needs?*

Raise state user taxes in concert with a strong increase in Federal user taxation.

15. *Proposals have been discussed that would return responsibility for parts of the Federal-aid highway program to the States. Under what conditions do you think such a turn-back would be workable?*

None.

16. *What is your view on diverting highway user revenue to transit?*

We have decided that this is not in the best interests of maintaining the integrity of the concept of a one-to-one correspondence between use and payment in user fee taxation. User taxes in the past have frequently been looked upon as the goose that laid the golden egg and, as a result, became diverted for other fiscal and political uses to the detriment of the roads. Transit could become the finger under the lid of Pandora's Box.

(more)

17. *It has been said that toll roads could better match rates to actual road costs. What is your position on toll financing of highways?*

Against it. Toll roads have been and continue to be an exceptionally unfair form of ad hoc taxation which the Federal government and the Congress nevertheless continue to sanction on certain Federal-aid roads, even those of a thoroughly Interstate character.

18. *At what point does the road damage and deterioration become so severe as to constitute a major, national problem? How large-scale do you believe the highway infrastructure needs are at present?*

When thousands of miles of major thoroughfares literally become untraversable; but let us hope that we are not so foolish as to let it come to that, although the current R-R-R program is doing a good job of moving us in that direction.

Highway infrastructural deficiencies for safety and for accomodating projected traffic needs at, say, the millenium, are quite severe at present and no adequate long-range response has been authored by the Congress.

Respectfully submitted,

G.A. Donaldson, Ph.D.
Highway Safety Project

FOLLOW-UP QUESTIONS FOR THE CENTER FOR AUTO SAFETY

1. Cars are becoming smaller and lighter while trucks become larger and heavier. Also, the percentage of cars in the vehicle traffic stream is declining while the percentage of combination trucks increases. Given this, what changes, if any, do you believe should be made in the Federal road use tax system?

2. Has the Center for Auto Safety reviewed the recent DOT study, Investigation of Truck Size and Weight Limits? If so, what is your opinion of the study's recommendations?

3. The truck size and weight issue is before a number of State legislatures as well as Congress. What do you see as the major considerations in any proposal to raise size and weight limits? How much is safety a concern?

4. Has the Center for Auto Safety reveiwed the Highway Cost Allocation Study recently completed by DOT? If so, how valid do you believe the study's assumptions, methodology, and findings to be?

5. What do you believe the major cause of bridge and road deterioration to be?

6. Do you believe inadequate maintenance has contributed to the deterioration of roads and bridges? If so, what are the reasons for inadequate maintenance?

7. What specific safety concerns do you have with deteriorating highway facilities? What kinds of problems do motorists face in driving on roads which are considered in poor to fair condition?

8. How much of pavement wear is due solely to environmental conditions and how much seems to be an interactive effect between loads and environmental factors?

9. The 1962 American Association of State Highway Officials Road Test found that a fully loaded tractor-trailer/semi combination does the same amount of pavement damage as it takes 9,600 cars to cause. The recent DOT cost allocation study uses a ratio of approximately 1 to 18. Do you believe this is a conservative estimate?

10. The DOT cost allocation study found that in 1985, under the current tax system, autos will pay 100 percnet of their cost responsibility while heavy combination trucks will pay only 65 percent. What actions should be taken to better match cost assignments with cost responsibilities for all vehicle classes?

11. At the August 10, 1982 hearing, Mr. Donaldson suggested that there be at least a doubling in highway user fees. Did he

mean a doubling of all the current excise taxes or only the motor fuels taxes? Please comment on the three alternatives developed by committee staff.

12. What effect would increasing only the Federal ~~gas~~ fuel tax have on the equitable distribution of costs among the vehicle classes?

13. Some of the States presently impose a differential gasoline and diesel fuel tax. The DOT suggests that consideration be given to such a fuel differential at the Federal level. What is your view of such a proposal?

14. The American Association of State Highway and Transportation Officials has testified about States' difficulties in meeting the costs of highway maintenance, not only on the Interstate and bridges, but also on the urban and secondary system. What do you believe the States can do to enhance their ability to finance their share of these needs?

15. Proposals have been discussed that would return responsibility for parts of the Federal-aid highway program to the States. Under what conditions do you think such a turn-back would be workable?

16. What is your view on diverting highway user revenue to transit?

17. It has been said that toll roads could better match rates to actual road costs. What is your position on toll financing of highways?

18. At what point does the road damage and deterioration become so severe as to constitute a major, national problem? How large-scale do you believe the highway infrastructure needs are at present?

CENTER FOR AUTO SAFETY

TAXES	CURRENT LAW	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Gasoline	$.04/gal.	$ .08/gal.	$ .06/gal.*	$ .09/gal.
Diesel	.04/gal.	.08/gal.	.06/gal.*	.13/gal.
Tires	.0975/lb.	<100 lb.-$.125/lb. >100 lb.-.25/lb.	>50 lb.-.15/lb.	>50-100 lb. - .12/lb. >100 lb. - .25/lb.
Tread Rubber	.05/lb.	$ .25/lb.	.075/lb.	.25/lb.
Inner Tubes	.10/lb.	.10/lb.	0	0
Oil	.06/gal.	.06/gal.	.09 gal.	0
Truck Parts	8% price	12% (trucks>33K lbs.)	10% (trucks >10K lbs.)	8% (trucks >33K lbs.)
Truck Sales	10% on price	12% (trucks > 33K lbs.)	10% on price	8% (trucks >33K lbs.)
Use Tax	$3/1,000 lbs. (>26K lbs.)	26-33Klbs.-$3/K 33-50K lbs.-$6/K 50-55K lbs.-$9/K 55-60K lbs.-$9/K 60-65K lbs.-$15/K 65-70K lbs.-$17.50/K 70-75K lbs.-$20/K >75K lbs.-$22/K	$6/1,000 lbs. (trucks >26K lbs.)	** Single Axles: ≥9-11K lbs.-$3.70/K lbs. ≥11-13K lbs.-$11.70/Klbs. ≥13-15K lbs.-$17.80/Klbs. ≥15-17K lbs.-$24.30/Klbs. ≥17-19K lbs.-$32.40/Klbs. ≥19K lbs.-$37.20/Klbs. Tandom Axles: ≥17-19K lbs.-$2.10/Klbs. ≥19-21K lbs.-$4.40/Klbs. ≥21-23K lbs.-$6.40/Klbs. ≥23-25K lbs.-$8.30/Klbs. ≥25-27K lbs.-$9.60/Klbs. ≥27-29K lbs.-$11.10/Klbs. ≥29-31K lbs.-$13.20/Klbs. ≥31-33K lbs.-$15.50/Klbs. ≥33K lbs.- $18.20/Klbs.
Total Revenues Raised		$12.7 billion	$9.4 billion ($10.5 billion after FY85)	$12.7 billion

* $.07/gal. after 10/1/85

** Rates shown are for power unit axles. Trailer axle rates are half the power unit rate.

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Form FHWA-281
(Rev. 11-67)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
MINUTE · MEMO

Use this form in lieu of transmittal slips within Dept. of Trans. when message comment is to be retained as file material. Do not prepare carbons. Not to be used in lieu of Form FHWA-121 for informal correspondence.

SUBJECT

Fatality Rates By Vehicle and Highway Type

TO

C. Bennett
HHS-20
thru
Tom Hall

MESSAGE/COMMENT

In response to an outside request for information, you asked me if we could determine fatal accident rates for different vehicle types on different highway types. Intrigued by this request and the potential utility of such rates, I requested an array of data from FARS with idea of writing a comprehensive staff report on the subject. Because of other demands upon my time, I have been unable to analyze the data received from FARS and prepare the staff report.

However, for the purpose of answering the original inquiry I have analyzed the 1979 fatality figures and summarized the preliminary results on the attached table. A couple words of precautionary explanation:

1. The rates are based upon fatality counts in accidents in which the vehicle type was involved. Hence a fatality may be counted twice if two different vehicle types were involved.
2. To calculate fatality rates fatality frequencies from FARS were matched with estimates of travel given in table VM-1 of "Highway Statistics, 1979." Although the vehicle miles of travel estimates are the best information we have, they are difficult estimates to make. The fatality rates derived from these estimates are very informative but should be used with caution.

When time permits me to complete the analysis, rates for the years 1978, 1979, 1980, will be calculated, counting not only fatalities but vehicles, accidents, and occupant fatalities.

Attachment

FROM/DATE

NR Stoner
HHS-21
8/24/81

Fatality Rates(2) By Vehicle And Highway Types
1979

Highway Type	All Personal Passenger Vehicles (1)	All Buses	Single Unit Trucks	Combination Trucks
Interstate Rural	1.74	2.46	2.96	3.49
Other Main Rural(3)	5.95	6.18	7.02	8.87
Local Rural(4)	3.30	1.90	8.95	6.90
All Rural	4.92	4.80	6.71	6.06
Interstate Urban	1.20	1.50	2.85	5.80
Other Urban(5)	2.96	8.52	2.82	12.20
All Urban	2.96	6.65	2.84	9.46
Total	Pass. car + on/off rd. veh. 3.31 Motorcycles 22.90	6.16	4.72	7.44

(1) - Includes passenger cars, on/off road vehicles, and motorcycles.
(2) - Number of fatalities in which the vehicle type was involved, divided by estimate of 100 MVM for that vehicle type.
(3) - Includes: Other Federal-aid (F.A.) Primary-Rural Arterial, F.A. Secondary-Rural Collector, Non-F.A. Rural Arterial, Non-F.A. Rural Collector.
(4) - Includes: Non-F.A. Rural Local.
(5) - Includes: Other F.A. Primary-Arterial Urban, F.A. Urban-Arterial Urban, F.A. Urban-Collector Urban, Non-F.A. Arterial, Collector, and Local-Urban.

DATA SOURCES:
A. 1979 Fatal Accident Reporting System - (FARS), NHTSA.
B. "Highway Statistics, 1979" - Table VM-1, FHWA.

TESTIMONY
OF
WILLIAM H. DEMPSEY
PRESIDENT, ASSOCIATION OF AMERICAN RAILROADS

ON
"CURRENT HIGHWAY NEEDS VERSUS EXISTING HIGHWAY REVENUES"

I am William H. Dempsey, President of the Association of American Railroads. Our members operate 94 percent of the total railroad mileage in the United States, employ 92 percent of the railroad work force and carry 98 percent of the nation's rail freight traffic. I appreciate the opportunity to appear before this Committee as it prepares to address two matters of great importance to the railroad industry: the Department of Transportation's recently completed Federal Highway Cost Allocation Study and the level and structure of the Federal Highway Trust Fund user charges.

My statement will develop seven basic points:

1. There is a clear need for increased highway funds.
2. The present system of user charges is not only inadequate to meet the needs of the system, but misallocates costs, creating a subsidy to heavy trucks.
3. This subsidy is harmful to railroads competing with heavy trucks. It is also harmful to the economy because it distorts market choices.
4. The federal cost allocation study recommends user charges representing a first step toward full-cost recovery.
5. The American Trucking Associations' proposal would not raise adequate funds and would worsen the present inequity.

6. The heavy truck tax rates proposed for discussion by this committee would perpetuate the heavy truck subsidy.
7. User charges should relate as directly as possible to the cost responsibility of each user. Changes in the present form of user charges are needed to achieve this.

I believe all of these points bear strongly upon the matter before the Committee today.

1. The Need for Increased Highway Funds

A 1981 report by the Department of Transportation, The Status of the Nation's Highways, offers clear evidence of extensive highway deterioration. Between 1975 and 1978, the Interstate highway mileage in need of immediate repair or reconstruction more than doubled, rising from 4 to 9 percent of total Interstate mileage. The quality of non-Interstate, federal-aid highways has also declined.

The costs of allowing this deterioration to continue are potentially staggering. Even small reductions in pavement quality increase the costs of operating and maintaining motor vehicles by billions of dollars annually. As highway repair is delayed, the expenditures eventually required for repair rise sharply, because as pavements deteriorate each additional heavy axle application causes more damage than the previous applications. Thus highway quality declines at an accelerating rate.

The Congress has not increased federal user charges since 1961, yet road repair costs have quadrupled since that time. In addition, fuel taxes, a major source of highway funds, have grown very slowly as high prices have restrained the demand for motor fuel and stimulated the production of more fuel-efficient vehicles. Clearly, increases in Highway Trust Fund user charges are long overdue.

However, it is equally necessary that the structure of these charges be altered. The need for additional revenue requires a prompt answer to the question of the most equitable manner in which to finance highway repairs. Without such a restructuring, additional highway taxes would worsen the inequities of the current user charge system.

2. Present System Misallocates Responsibility

A major finding of the Highway Cost Allocation Study is that the current system of federal user charges allows heavy combination trucks to pay far less than their share of the federal highway budget. The study indicates that, as a class, the heaviest combination trucks pay only about 45 percent of their cost responsibility. Unless the user charge structure is modified to eliminate this underpayment, a costly and inequitable subsidy to the motor carrier industry by other highway users will continue.

This subsidy is a major cause of the present funding shortfall. The Department of Transportation (DOT) has cited the growth of long-distance trucking as an important cause of the unexpectedly rapid deterioration of our highways. DOT has estimated that by 1985 the heavy truck underpayment would equal $2 billion a year if taxes were not increased.

Truck weight and size limits have increased continually, imposing still greater highway costs. But the increasing heavy truck share of highway costs has not been matched by a commensurate increase in their user fees. As a result, other highway users -- especially those in light and medium trucks -- have paid more than their share of the highway budget. Moreover, as the highway budget has become insufficient to keep pace with highway deterioration, highway users have incurred the added costs of using substandard roads.

The existence of this subsidy to heavy combination trucks has been documented in numerous highway cost allocation studies, including several recent state studies (see Table 1) and the federal study just released. Equity in the federal highway user charge system and the protection of the nation's massive investment in highways are each sufficient reasons to eliminate the subsidy. By virtue of its extensive competition with motor carriers, the railroad industry also has a stake in eliminating the heavy truck subsidy.

3. The Truck Subsidy Harms Railroads -- And the Economy At Large

Railroads now compete with motor carriers for a major share of their revenues. According to estimates by a DOT economist, as much as 70 percent of rail revenue is derived from truck-competitive freight. Rail rates on this traffic depend directly on the corresponding level of truck rates. Allowing trucks to escape part of their costs -- their full share of the highway budget -- provides a subsidy which permits truck rates to be reduced and artificially made more competitive with rail rates.

While the subsidy may reduce truck rates, it has the opposite effect on total transportation costs. The heavy truck subsidy diminishes the overall efficiency of the transportation system. Rail rates must cover full costs including the costs of track structure and other fixed facilities. In contrast, because of inadequate user charges, trucks can attract shippers with rates below full costs. The average motorist pays for the heavy trucks' unrecovered highway costs. Transportation efficiency declines because shipments that could move more cheaply by rail are instead lured to the highway. Although some shippers and carriers benefit from below-cost rates, total transportation costs rise when goods move by the more expensive mode.

Subsidized competition has contributed importantly to the rail industry's poor rate of return. Although rail industry earnings have increased in the past several years, they still lag badly behind most returns earned elsewhere in the economy. In 1980, risk-free government bonds, for instance, paid interest rates of 11.4 percent. In that year, the rail industry's return on investment was 4.1 percent.

4. The Federal Cost Allocation Study

The recent federal highway cost allocation study represents an important advancement in the understanding of highway costs and their relationship to traffic. It provides a sound basis for restructuring federal trust fund user charges. However, the study's recommendations should be regarded as, at best, a minimum estimate of the required heavy truck user charge increases.

The study's most important improvement on previous work is in its treatment of pavement costs, both for new pavement and so-called 4-R -- repair, resurfacing, reconstruction, and rehabilitation. The study has finally discarded the invalid and thoroughly discredited "incremental method" of allocating pavement repair costs. While we do not agree with some aspects of the DOT pavement cost analysis, there can be no question that it is greatly superior to any approach used in previous federal studies.

The study is not without flaws, however. The most important of these is its treatment of the "residual" costs which account for some 47 percent of the federal highway budget. As the study notes, these costs cannot be assigned on the basis of highway use. DOT selected a formula for allocating residual costs which is highly favorable to heavy trucks and reduces their cost assignment to a minimum.

As the study states, residual costs may be assigned in many ways. Under the formula chosen in the study, passenger vehicles would pay 90 percent of residual costs while combination trucks pay only 6 percent. The application of another, equally valid, formula would significantly increase the estimate of heavy truck cost responsibility.

The study assigns residual costs to each user class in proportion to its share of the total vehicle miles travelled (VMT). An alternative would be to assign these costs in proportion to the value each vehicle class derives from highway use. Table 2 compares the results of this allocation formula with those of DOT and with the current tax structure. Combination truck cost responsibility would increase by 25 percent if this procedure were used. There is no objective reason why a vehicle-mile formula is preferable to one based on value of service. DOT's decision to use the VMT formula is simply an arbitrary policy choice which favors heavy trucks.

The very small share of residual costs assigned to heavy combination trucks is a major reason that the results of the cost allocation study should be accepted as the minimum standard for increased heavy truck user charges. User charges based on the full amount recommended in the DOT cost allocation study would cover little more than the costs directly attributable to heavy combination trucks, leaving the common cost burden to be borne almost entirely by light vehicles.

A second important reason that Congress should adopt the full cost shares assigned in the study is the continuing heavy truck underpayment at the state level. States now collect approximately two-thirds of all highway user charges. Full cost recovery at the federal level would provide the states with a useful precedent and ensure that the federal highway program can assume its full share of the increased burden of highway repair.

Finally, the prospect of increased truck sizes and weights adds to the need for user charge levels at least as high as those the study recommends. Bigger, heavier trucks would be responsible for a larger share of highway costs than the study indicates. The added cost responsibility associated with higher weights and sizes justify user charges above the levels recommended by DOT.

5. The ATA Tax Proposal

The American Trucking Associations (ATA) has proposed a set of increased user fees to support an expanded federal highway program. This proposal appears to have two basic deficiencies. First, it would not raise enough revenue. Second, and in our view more fundamental, it not only fails to eliminate the heavy truck subsidy, but sharply increases the overpayment by single unit trucks and leaves the share paid by heavy combination trucks virtually unchanged. In fact, it would reduce the share of costs paid by combination trucks registered at gross weights between 50 and 70 thousand pounds (see Table 3).

The ATA proposal relies heavily on taxes which are only indirectly related to use -- the excise taxes on new trucks and on truck parts. These taxes are assessed on truck characteristics with little relationship to highway costs. The user charge structure should begin to shift away from these taxes toward those based directly on use.

The proposal does no better in modifying the one direct user charge among the Trust Fund taxes, the Federal Heavy Vehicle Use Tax. Simply doubling the rates is inadequate. This tax should be restructured to reflect the steep increases in vehicle cost responsibility which occur as vehicle weight increases. DOT's recommendation to modify this tax by creating a graduated rate structure is far superior.

The ATA tax proposal does not deserve serious consideration by this Committee. While flawed, the Federal Highway Cost Allocation Study at least represents a genuine effort to improve the fairness and economic efficiency of federal highway user charges. If enacted, the ATA proposal would thwart the development of a sound, cost-based system of highway user charges.

6. Committee User Charge Proposals

None of the three user charge alternatives proposed for discussion by this Committee would eliminate the heavy truck subsidy. Alternative 2, the least desirable option, appears similar to the ATA proposal, which would worsen the misallocation of highway costs among users. Alternatives 1 and 3 fall short of recovering even the minimum share of highway costs which the DOT study assigned to heavy trucks.

Alternatives 1 and 3 do represent some improvement over the present user charge structure because they include graduated, weight-based taxes on the heaviest trucks. The cost allocation study found that a significant portion of highway costs rise sharply with increased axle weights. If heavy trucks are to meet their full cost responsibility, highway taxes must parallel the relationship between vehicle weight and highway costs.

However, the user taxes proposed in Alternatives 1 and 3 are not graduated steeply enough. An 80,000 pound, five-axle truck, does three times the pavement damage per mile of a 60,000 pound truck, yet under Alternative 1 the use tax on the heavier truck would be only twice that on the lighter vehicle. The other taxes in Alternative 1 would impose an even smaller differential between the two vehicles. Both Alternatives fall far short of full cost recovery. Alternative 1 represents a total tax burden equal to 76 percent of heavy truck cost responsibility (as shown in Table 4). The same table shows that Committee Alternative 3 recovers only 74 percent of cost responsibility for an 80,000 pound truck. There is no valid reason for considering less than full cost recovery for any vehicle class.

Alternatives 1 and 3 assign $1 billion by urban vehicle miles of travel, presumably to reflect the relationship between highway congestion and the demand for mass transit. A more accurate surrogate for congestion costs could be derived by weighting vehicle miles travelled by passenger car equivalents. This adjustment would take account of the fact that heavy trucks use more highway capacity than do cars and other light vehicles. This would distribute the $1 billion more equitably among those vehicles responsible for urban congestion.

7. The Need for Cost-Based User Charges

The form and level of highway user charges should parallel highway cost responsibility. This ensures that highway costs are equitably shared among users and promotes the economically efficient use of the highway system. Users receive clear signals of the costs entailed by travel. Where the costs exceed the benefits, highway use is discouraged and resources are saved. Both equity and economic efficiency are consistent with the Congressional mandate.

The most important modification needed in the current tax structure is the inclusion of a graduated tax based on vehicle weight. The progressive increase in highway cost responsibility which occurs as vehicle weight increases makes such a tax mechanism necessary if heavy truck user charges are to match their share of costs. Of the options presented in the cost allocation study, those which rely on a graduated version of the Federal Highway Use Tax appear best. (Highway Cost Allocation Study - Tables 6-8, options 2A, 2B, and 2C). The best of these is Option 2C. It is superior because it shifts the burden onto the taxes based on the actual characteristics of vehicles using the highway system. Other user charges, such as excise taxes on new equipment, are less desirable because they are based on characteristics which have little or no bearing on highway cost responsibility. For example, expensive household goods trailers would pay a higher excise tax while imposing much smaller highway costs than relatively inexpensive steel-hauling flatbed trailers. A system of graduated fuel taxes with rebates for light vehicles, proposed in option 2D, would pose an unjustified administrative burden. It also would fail to capture important differences in highway cost responsibility among vehicles in the same broad weight categories, since fuel consumption does not increase even in proportion to weight, let alone highway costs.

We would strongly support an effort to improve the enforcement of Federal Heavy Vehicle Use Tax. Such an effort is already overdue and increasing the tax rates will increase the incentives for evasion. The added revenues from the tax should also make an enhanced auditing and enforcement effort worthwhile.

A graduated heavy vehicle use tax would greatly improve the current tax structure. There will remain, however, a significant degree of discrimination against low-mileage vehicles. As Table VI-6 (p.VI-19) in the study shows, (see Table 5) there is an extremely wide variation in annual travel by vehicles within each weight class, particularly at the highest weights. While the median annual mileage for vehicles with registered gross weights of 70-80 thousand pounds is about 55,000 miles, the range (the difference between the mileage reported by the 10th and 90th percentiles) is

110,000 miles. The cost responsibilities of high-mileage vehicles in this class can thus be several times that of vehicles near the low mileage extreme.

In fact, the current tax structure's failure to account for mileage introduces a major inequity. As Table 6 illustrates, the average high-mileage heavy truck would pay only 74 percent of its per-vehicle mile cost responsibility even if the user charge rates were set to achieve full cost recovery for the average heavy truck. Rates such as those suggested by the Committee would further exacerbate the underpayment of high-mileage heavy trucks. The ideal solution, however, is not simply higher rates for the existing taxes.

The solution to this problem is a federal weight-distance tax. The FHWA states in the study (p. VI-17) that the weight-distance tax could contribute significantly to a fairer and more efficient tax structure. With appropriate cooperation from the States, of which all but two already require carriers to keep mileage records as part of their enforcement of fuel use taxes, such a tax could provide a greatly improved match between heavy vehicle user fees and cost responsibility at a very small added administrative cost.

States could be induced to share in the enforcement of weight-distance taxes in exchange for a share of the revenues. This proposal is essentially similar to the axle-weight tax, which this Committee has proposed for discussion. Like that proposal, it would require states to contribute to the federal enforcement effort by sharing information which, in general, they already collect. At the very least, Congress should strongly encourage Treasury to present an administrative and enforcement plan for a weight-distance tax. Congress could then more accurately assess the weight-distance tax concept.

Conclusion

Mr. Chairman, in closing I would like to reemphasize the main points of my statement.

There is a clear need for increased highway funds. A large share of these funds should be paid by heavy combination trucks, which receive a significant subsidy under the present federal user charges. This subsidy is harmful to the railroad industry and to the motorists who pay for and use the highways. The Federal Highway Cost Allocation Study recommends an increase in heavy truck user charges needed to eliminate the subsidy. This recommendation represents the minimum payment consistent with the principle of full cost recovery. The most important element of the highway user charge package proposed by the Department of Transportation is the graduated heavy vehicle use tax, the only user charge which reflects the increases in highway costs which result from added vehicle weight. The user charge increases proposed by the American Trucking Associations are wholly inadequate either to raise sufficient highway revenue or to eliminate the subsidy to heavy combination vehicles. Unfortunately the tax alternatives proposed by the Committee, while improvements over existing user charges, still fall far short of recovering the heavy trucks' full share of highway cost responsibility.

Thank you, Mr. Chairman, for the opportunity to appear before you today. This concludes my remarks. I would be happy to answer any questions you or other members of the Committee may have.

Table 1

A Summary of Findings From Recent State Highway Cost Allocation Studies

State	Heavy Truck Underpayment
Colorado (1981)	80%
Florida (1979)	100%
Georgia (1979)	124%
Mississippi (1980)	85.7%
Oregon (1980)	73.9%

Table 2

Cost Responsibility Under Two Residual Cost Assignment Methods Compared

to Current User Tax Payments, 1985[1]

($ millions)

Vehicle Category	Current tax[2] structure	DOT method Cost Responsibility	Value of Service method Cost Responsibility
Passenger vehicles	6,932	7,067	5,832
Autos	4,636	4,772	3,810
Motorcycles	35	60	62
Pickups & vans	2,256	2,080	1,798
Buses	5	155	162
Trucks	5,068	4,933	6,168
Single units	1,885	947	1,198
< 26	702	412	480
> 26	1,183	535	718
Combinations	3,183	3,986	4,970
< 50	407	330	370
50-70	778	622	804
70-75	871	1,123	1,401
> 75	1,127	1,910	2,395
Total	12,000	12,000	12,000

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[1] FHWA arbitrarily selected VMT as the method to allocate residual costs which amount to 47 percent of Federal costs. Alternative methods yield very different distributions of cost responsibility. An alternative to VMT shown here is benefits-received based on estimates of either revenue or operating plus time costs for each vehicle class.

[2] The Highway Cost Allocation team examined several tax schedules and adjusted tax rates so that each schedule raised equivalent revenues. Although revenues shown in this column reflect the current tax structure, the revenues have been adjusted upward to raise $12 billion.

SOURCE: Responsibility numbers based on benefits-received were developed by IPSG staff. Other information was derived from the Final Report on the Federal Cost Allocation Study, May 1982, and conversations with FHWA staff.

Table 3

User Tax Payments Under Three Tax Alternatives, 1985
($ millions)

Vehicle Category	Tax Revenues		
	Current tax[1] structure	ATA proposal	DOT Alternative 2C
Passenger vehicles	6,932	5,478	7,086
Autos	4,636	3,692	4,779
Motorcycles	35	24	31
Pickups & vans	2,256	1,757	2,122
Buses	5	5	154
Trucks	5,068	3,901	4,914
Single Units	1,885	1,455	959
< 26	702	558	439
> 26	1,183	897	520
Combinations	3,183	2,446	3,955
< 50	407	312	295
50-70	778	590	625
70-75	871	673	1,126
> 75	1,127	871	1,909
TOTAL	12,000	9,379	12,000

[1] The Highway Cost Allocation team examined several tax schedule alternatives and adjusted tax rates so that each alternative raised the equivalent revenues. Although the revenues shown here reflect the current tax structure, the tax rates have been indexed upward to raise $12 billion.

SOURCE: Final Report on the Federal Cost Allocation Study, May 1982, and conversations with FHWA staff.

Table 4

FEDERAL TAXES PAID BY A 5 AXLE 80,000 POUND VEHICLE

UNDER DIFFERENT TAX STRUCTURES

FEDERAL TAX	CURRENT	COST ALLOCATION STUDY ALTERNATIVE 2C[b] (full cost recovery)	COMMITTEE ALTERNATIVE		
			1[a]	2	3[a]
Fuel	$ 520	$1,245	$1,040	$ 779	$1,689
Heavy Vehicle use	168	3,180	1,295	340	1,007
Excise	938	440	1,128	938	752
Trucks parts and accessories	93	0	138	115	92
Tires, tubes, and tread	72	195	225	111	213
Oil	12	0	12	19	0
TOTAL	$1,803	$5,060	$3,838	$2,302	$3,753

[a] To raise $12.7 billion.

[b] HCAS alternative 2C tax rates were adjusted to raise $11.7 billion. The remaining $1 billion were allocated on the basis of urban vehicle miles of travel and the number of vehicles above 75,000 pounds.

Table 5

Table VI-6
Truck Inventory and Use Survey (TIUS)
Annual Mileage by Gross Registered Weight Group

Gross Registered Weight Group	Median Annual Mileage	Range of Annual Mileage Reported[1]
1. <10,000 pounds	8,296	18,000
2. 10 - 20,000	9,944	34,000
3. 20 - 30,000	8,000	23,000
4. 30 - 40,000	10,000	30,000
5. 40 - 50,000	13,500	49,000
6. 50 - 60,000	16,000	64,000
7. 60 - 70,000	20,131	74,500
8. 70 - 80,000	54,861	110,000

[1] Range is the difference between the mileage reported by the 10th and 90th percentiles. This corresponds to the middle 80 percent of the TIUS respondents.

Table 6

FEDERAL TAXES PAID BY A FIVE-AXLE 80,000 POUND VEHICLE UNDER TWO ANNUAL MILEAGE SCENARIOS

TAX[1]	67,930[2] Annual Miles	108,000[3] Annual Miles
Fuel	$ 1,245	$ 1,981
Heavy vehicle use	3,180	3,180
Excise	440	440
Tires and tread	195	310
TOTAL	$5,060	$5,911
$/Mile	$ 0.074	$ 0.055

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[1] Assumes a federal highway program budget of $12.7 billion. HCAS alternative 2C tax rates were adjusted to raise $11.7 billion. The remaining $1 billion were allocated on the basis of urban vehicle miles of travel and the number of vehicles above 75,000 pounds. The figures on each type of tax were adjusted to account for the actual amount of tax per vehicle FHWA expects to collect.

[2] Federal Highway Cost Allocation Study estimate of average annual mileage.

[3] National Motor Transport Data Base estimate of average annual mileage.

ASSOCIATION
OF AMERICAN
RAILROADS

William H. Dempsey
President

October 25, 1982

The Honorable Steven D. Symms
452 Russell Senate Office Building
Washington, DC 20518

Dear Senator Symms:

Enclosed are our responses to your follow-up questions to the recent hearings on highway program needs, revenues, and cost allocation issues. I hope you find these answers informative. Please call me or Lee Lane of my staff (202) 835-9567 if we can provide anything further.

I appreciate your interest in our views on highway cost allocation and user charges.

Sincerely,

Enclosures

1920 L Street, N.W., Washington, D.C. 20036 (202) 835-9126

FOLLOW-UP QUESTIONS FOR THE AMERICAN ASSOCIATION OF RAILROADS

1. In the competition for freight traffic, the railroads' share has been declining while trucks' share has steadily climbed. How much of the freight business is rail-truck competitive and what economic impact do you foresee if taxes on the heaviest trucks are raised as much as 70 percent?

2. The railroads argue that they should carry loads of 50,000 pounds or more while the trucking industry continues to seek an increase in the Federal weight limit of 80,000 pounds. Aren't there many regions where because of the unavailability of rail service, heavy trucks are the only means for moving heavy loads? In the interest of productivity, shouldn't consideration be given to increasing truck size and weight limits?

3. While several States have implemented a weight-distance tax, there is concern that such a tax would be difficult to administer and enforce at the Federal level. You have suggested a role for States in the collection of such a tax. Exactly how might all the States be persuaded to help enforce such a tax and what share of the revenues should they receive in exchange?

4. There is also the suggestion that States might assist in collection of the Federal heavy vehicle use tax. Again, how receptive do you believe States would be to such a proposal and what financial incentives might be needed?

5. The DOT cost allocation study says that consideration should be given to exempting piggyback trailers from the new truck excise tax. What is the magnitude of this tax, its impact on the railroad industry, and what would be the effect if the tax were eliminated?

6. The American Trucking Associations commissioned two studies of pavement deterioration--Causes of Pavement Damage on Interstate Highways, done by CounselTrans, Inc., and the Effects of Truck Weights on Pavement Deterioration, by the Texas Transportation Institute. Has AAR reviewed the ATA studies, and if so, would you please supply that analysis for the record?

7. AAR has publicized a recent Citicorp study of 74 U.S. industries in which motor carriers ranked first in return on net worth. The ATA calls this "just another example of misleading reports regarding the financial state of the industry." What is your response to the ATA rebuttal, which states that "extraordinary items" were included in the net income computations?

8. It has been said that toll roads could better match rates to actual road costs. What is AAR's view on toll financing highways?

9. The ATA maintains that more States have discontinued the weight-distance tax than presently impose it. Why have States decided against the tax after once implementing it?

WILLIAM H. DEMPSEY
PRESIDENT, ASSOCIATION OF AMERICAN RAILROADS

RESPONSES TO QUESTIONS ON FINANCING THE FEDERAL HIGHWAY PROGRAM

SUBMITTED FOR THE
RECORD OF HEARINGS BEFORE
THE TRANSPORTATION SUBCOMMITTEE
OF THE SENATE COMMITTEE
ON ENVIRONMENT AND PUBLIC WORKS

OCTOBER 26, 1982

1. A U.S. DOT economist has estimated that as much as 70 percent of railroad revenue is earned on truck-competitive traffic. This is traffic on which rail rates depend directly on the corresponding level of truck rates. Trucks have already grained a significant share of the market, particularly for manufactured goods. There remains a broad range of truck-competitive traffic which better TOFC service, the rise of shipper associations, and other innovations can help the railroads retain.

The economic impacts of increasing user charges on the heaviest trucks by 70 percent (which is less than the increase called for in the Federal Highway Cost Allocation Study) would be modest. Even doubling federal user charges on the heaviest trucks would increase motor carrier operating costs by less than 2 percent. While this increase would have a negligible impact on consumer prices, it would have an important competitive effect. Applied to the large volume of truck-competitive rail traffic, even small percentage changes in rates can measurably improve rail earnings. Highway user charges also offer a partial, but vital, offset to truck size and weight gains.

2. The lack of adequate heavy truck user charges, as shown in the Federal Highway Cost Allocation Study and numerous recent state studies, has contributed to the shortfall in highway funds and placed the railroad industry at a competitive disadvantage. Increasing truck weight and size limits without first raising heavy truck user charges would increase the cross-subsidy truckers receive from other highway users and widen the highway funding shortfall. The result would be increased highway deterioration and truck-rail competition based on subsidies rather than the costs and service of each mode. Transportation misallocation and deterioration highways could lead to losses in productivity. User charges should recover the full heavy truck share of highway costs before any increases in weight and size limits are enacted.

3. States could play an important role in administering a federal weight-distance tax by sharing information on vehicle mileage with the Federal government. Since most states already require truckers to report vehicle mileage as part of their administration of the fuel tax, sharing this information would not burden states. States should receive revenue sufficient to reimburse them for the costs of supplying mileage information to the federal government. Truckers would find that complying with a federal weight-distance tax is easier than with state fuel or weight-distance taxes, as they would need only report total mileage rather than a state-by-state breakdown. A weight-distance tax would be most easily applied and yield the greatest gains to the heaviest combination vehicles.

4. States could probably best assist in collecting the federal heavy vehicle use tax by requiring proof of payment of the tax upon state registration of the vehicle. The state might also be empowered to collect the federal tax and issue a sticker or other proof of purchase. Some form of compensation, such as a percentage of the taxes collected, would be necessary in either case. The compensation should be given directly to the agency responsible for administering the tax and should be based on the administrative expenses incurred.

5. Transamercian Realco, the nation's largest piggyback lessor, estimates that in 1981 new truck excise tax revenue from the sale of piggyback trailers totalled $29.5 million. This tax is part of railroad costs and thus is reflected in rail rates. Exempting piggybacks from the truck excise tax presumably would affect rail rates slightly.

6. The Association of American Railroads asked a leading engineering consulting firm, ARE, Inc., to review Texas Transportation Institute pavement deterioration studies. ARE's report, "An Assessment of Load and Environmental Effects on Pavement Deterioration," a summary of the report's findings (AAR MEMORANDUM, April 28, 1982). and an ARE letter critique of ATA's "Summary Analysis of Effects of Truck Weights of Pavement Deterioration," (ARE, Inc., January 25, 1982) are attached.

7. The need for user charges which recover the full heavy truck share of highway costs is independent of the financial performance of the motor carrier industry. While most evidence indicates that trucking is generally quite profitable in spite of occasional depressed earnings due to overall economic conditions, even poor financial performance would not justify a subsidy in the form of inadequate highway user charges. Such a subsidy is inequitable to the highway users who must make up the truck underpayment and an ineffective means to improve motor carrier profitability. Road use is part of the cost of providing truck service. If rates cannot cover all costs, then the service is uneconomical, causing road damage and other costs which exceed its benefit.

8. Financing roads through tolls would permit a better match between user charges and highway costs. The good condition of the Nation's toll roads indicates that tolls can also yield adequate funds for road repair. The AAR would urge that toll finaning be explored, particularly for major intercity highways.

9. Some trucking intersets claim that the number of state third structure taxes has sharply declined since the 1950's. We have tested this assertion by comparing third structure taxes in 1965 with those now in force. 1965 is the date of the oldest reliable compilation of third structure tax material.

Our comparision shows that at least for the last fifteen years the truckers' contention that there has been a massive movement away from third structure taxes is false. In no case has true weight-distance or ton-mile tax been repealed ("true" weight-distance taxes are those that vary with the vehicle's weight). With one exception, the repeal of the Flordia flat mileage tax, taxes that have been changed were either gross receipts or in lieu taxes. Gross receipts taxes have generally been abandoned because they burden only for-hire carriers. In lieu registration fees have disappeared as registration proration plans are adopted. Two states with gross receipts taxes -- New Mexico and Arizona -- have replaced them with weight-distance taxes, although in Arizona's case the change is only tentative.

The number of states with graduated and effective third structure taxes has thus risen, not fallen in the past fifteen years. the following chart sets out the tax changes in detail.

STATE	1965	1981
Arizona	Gross receipts (for hire).	Current law calls for the gross receipts tax to expire in 1982, with a weight-distance tax to replace it.
California	For hire gross receipts tax.	Repealed
Colorado	Ton-mile	Same
Florida	Flat mileage	Repealed 1965
Idaho	Weight distance tax	Same
Illinois	Weight distance in lieu of registration fee	Same tax, higher rates
Kentucky	2 cent surtax on three or more axles	2 percent surtax
Michigan	Public Service Commission fee; common and contract carriers only.	Same
Montana	Gross Receipts, common and contract carriers only	Same tax, slightly higher
Nevada	Mileage fee in lieu of unladen weight tax	Same
New Mexico	Gross Receipts	Weight distance tax
New York	Weight distance tax	Same
North Dakota	Axle-mile in lieu of registration fee -- interstate carriers	Repealed -- registration fees pro-rated
Ohio	Axle-mile	Same
Oregon	Weight distance	Same tax, higher rates
Pennsylvania	Gross receipts; credit for registration fee	Same
South Carolina	Public Service Commission fee	Same

STATE	1965	1981
South Dakota	In lieu of weight tax	Same
Utah	In lieu of registration fee	Repealed -- pro-rate adopted
Virginia	2 cent surtax on three or more axles	Same
Wyoming	Ton-mile	Same

AN ASSESSMENT OF LOAD AND ENVIRONMENTAL EFFECTS ON PAVEMENT DETERIORATION

REPORT NO. RR1/3

by

W. R. HUDSON

and

V. L. ANDERSON

December, 1981

[The following has been extracted from the above named report. The complete report has been retained in the committee files.]

EXECUTIVE SUMMARY

It is difficult to assess the relative effects of various vehicle loads, climate, and environment on highway pavements. This is, however, a timely and important subject for study. A recent report by TTI describes such a study, undertaken for the American Trucking Association and the Motor Vehicle Manufacturers Association (Ref. 2). While that study presents a detailed mathmatical treatment of the problem, the interpretation of the results by others has created concern. The present report undertakes to examine these concerns.

The TTI project staff has developed a detained mathematical approach to this problem. The mathematics presented are sound and provide a solid basis for analyzing data with respect to load and environmental effects. Unfortunately, the assumptions required to provide data for evaluation in this mathematical approach are inappropriate.

Another important contribution of the TTI study is the reassessment of the form of the mathematical models associated with the serviceability loss equations which were generated at the AASHO Road Test. Lytton, *et al.* point out that an S-shaped curve is more appropriate to the total form of the serviceability history curve than the form generated at the AASHO Road Test. This is an important contribution and should be pursued by the TTI staff.

In their conclusions, the authors do point out the complexity of the problem and the lack of consensus among the states. They point out the need to evaluate environment and climate in addition to the load effects and also the interaction effects. Nevertheless, it appears that certain Tables in the TTI Report can be misinterpreted by users as illustrated by the ATA summary of the report (see Appendix C).

In particular, it appears that Tables, such as Table 9, page C-16, in the TTI report (Ref. 2) in which approximately 0% damage is attributed to load and the balance is attributed to climate or combined effects can be misinterpreted. Similarly, Table C15 and C16, and the results on pages E25, E26, E27 and E28, (see Appendix A, herein) seem potentially misleading by implying load associated damage is 0 to 1% in cases examined.

As pointed out herein our concern about the TTI Report relates to the following factors:

1. The assignment of distress type by cause in terms of load, climate or combined effects is not possible and no consensus exists as outlined herein Section II.

2. The deduct values and waiting systems set up by the states vary widely, as quoted on page 56 of the TTI Report, ". . .the difference of opinion that exists between states on how heavily various types of distress should be weighted. . .".

3. Models developed for one state with a particular data base are not applicable to other states.

4. Inadequate statistical consideration of data of selection, analysis and inference space has been provided.

5. The interaction effects of load and environment are so strong as to preclude their useful separation, yet load effects seem to be active in nearly all environments.

In the middle of their page 58, the TTI staff points out ". . . available moisture appears to increase the amount of damage done by the loads. . .". We think the statement is relative to climate increasing the amount of damage done by loads is very appropriate and that the resulting interactions, which in our opinion this describes, are exceedingly important. Thus, the so-called "combined" effects quite often result in greater influence of load on damage than where the load effects are not involved with environmental effects. This same type of effect is illustrated by load zoning in frost-active areas in the spring thaw when heavy loads damage pavements more than light loads, and thus are prohibited from using the highways during this critical period.

It is also important to note, as the authors of the TTI Report have on their page 58, that there is an extreme difference of opinion that exists between states on how heavily various types of distress should be weighted. This is reflected in the broad range of deduct values, the types of scales and many other factors. And, in our judgment, indicates the futility of using the "opinions" of various field engineers in many states to judge the cause and the relative damaging effect of distress types.

We feel that the statement in the third paragraph of the TTI conclusions on page 60 of the subject report is critical in the same regard.

> "It is also apparent that at the present time there is no consensus among the states about what types of distress should be considered or how heavily each should be weighted in determining decision criteria for maintenance and rehabilitation activities."

In the analysis undertaken by the TTI staff, such a consensus is absolutely essential. Furthermore, there is need for observable empirical evidence rather than "opinion" of the states as to the types and weighting of distress factors.

Further, at the bottom of page 60, the authors indicate that in the estimation of "all of the states" clearly environmentally caused or climatically caused distress is important in decision making in pavement maintenance and rehabilitation. However, it does not appear that all states are in fact represented in the data.

Another important indication of the inconsistency of the apparent findings of the TTI Report are outlined on their page F-10, by Darter and Brandau (see Appendix A). Quoting from the page:

> ". . . unfortunately, none of the climatic variables entered into the model due to the small range of climatic conditions in Illinois . . ."

The only factors which entered into the PSI Model are age, eighteen kip equivalent axle loads, concrete thickness, steel reinforcement, type of subbase, and slab length. It is true that a predictive equation fitted to emperical data such as this cannot include a factor which did not vary within the range of the study, as in this case the climatic factors at least within the State of Illinois within this study did not vary enough to be included in this equation.

Equally important, however, is the fact that the model does include a very strong factor for traffic and load variables which are associated with the number of accumulated eighteen kip single axles and age. Similar type equations have been developed at the AASHO Road Test itself, and in Texas and many other states.

It is important to note that on the one hand climate and environment did not enter the equation, but on the other hand load effects did. Thus it could be assumed that for any given climatic or environmental conditions (which may be relatively narrow as Darter states to be the case here) the effects of load are still quite strong. In the Illinois example the correlation coefficient ($R^2 = 0.72$) is relatively robust for 345 data points.

This type of evaluation and thinking relates to the Anderson-McLean concept of independent modeling of interactions discussed herein (Ref. 20). That is given that the climate or the environment in a particular location is fixed, the deterioration of serviceability level can be modeled with respect to age, accumulated loads, and pavement design factors. It could be extremely valuable then to develop this type of model in several, or hopefully, all climatic regions of the U. S. The deterioration of serviceability with respect to load would then reflect implicitly the climatic or environmental effects as they truly exist in that location. In such an approach, damage could be allocated to the relative load effect under the actual existing conditions, and there would be no need to assess any so-called combined effect.

SECTION VI

CONCLUSION AND RECOMMENDATIONS

CONCLUSIONS

This is a brief report evaluating load and environmental effects on our nation's highways, with particular consideration given to reviewing the report produced by TTI for the American Trucking Associatio: entitled "Effects of Truck Weights on Pavement Deterioration". That report presents an excellent set of mathematical models dealing with the subject of pavement deterioration. Unfortunately, most of the assumptions and most of the "data" used in the study are inappropriate for the subject of evaluating load and environmental effects. The "data" used amount to the opinions of various state personnel as evidenced by the relative "deduct values" which they apply for various distress manifestations. Each distress manifestation has been allocated to load, environment, or combined effects, based on an unpublished FHWA Study by the University of Illinois and TTI.

Information summarized herein shows, along with many statements in the TTI Report, that it is impossible to ascertain a unanimous opinion about the assignment of these distress factors. In particular, there is vast disagreement on the ability of persons making condition surveys to assign cause to a particular distress type observed. Likewise, it is extremely doubtful that deduct values which have been arbitrarily assigned by state personnel with a variety of weighting functions and which have been "linearized" and modified by TTI research staff are useful in trying to describe what nature actually does with respect to load and environmental effects.

Finally, we find in the report a variety of tables which seem to indicate that load has less than 2% effect on pavement damage. While this is not the conclusion drawn by the report's authors, the multiplicity of these tables within the report can lead to a great deal of misunderstanding. This is perhaps best evidenced by a summary of the report which has already been published and distributed by the American Trucking Association and which is reproduced herein as Appendix C.

The statistical aspects of this study are inadequately treated and the inference space using the Illinois and Texas models is too narrow to make any meaningful conclusion. We therefore feel that the results of the TTI report should be practically discounted in terms of reasonable assessment of load effects on pavement deterioration.

A STATISTICIANS'S OVERVIEW

The first look at the TTI Report was surprising to a statistician. From knowledge obtained working on the AASHO Road Test, it seemed incredible that anyone or any group could suggest that only 1 or 2% of pavement damage was due to load alone. The apparent result demands that the following questions be answered:

1) What was the design of the study?
2) How were the data obtained?
3) What models were used?
4) Of what value was the study?

To investigate the first question (What was the design of the study?) one had to find out that the definition of the load-distress category really revolved around the variables 1) alligator cracks and 2) rutting only. This seemed very unreasonable because experience indicates there has been constant dispute among highway engineers on what variables are a measure of pavement deterioration due to load.

Given that the basic category, load, is in question, it seems reasonable to investigate the other four (4) categories outlined in the TTI report dealing with combinations of load, environment and load plus environment. All of these five categories from the design of the study and each had a definate set of measured variables to define it. As with load, there has to be questions from engineers whether the variables selected really properly identify the categories. All of these categories must be influenced by "interaction of load with environment". When interaction is present, one must be extremely careful in interpreting main effects as outlined in detail in the reference, Anderson, V.L. and McLean, R.A., "Design of Experiments: A Realistic Approach," Marcel Dekker, 1974.

Hence, one immediately sees weakness in the design of the study because one cannot isolate the true load effects from environment. The design of the study seems to be that the categories act as treatments and the various states in the study have each category represented and some of the categories are pooled. This arrangement does not allow independent estimates of load and environment.

To answer the second question (How were the data obtained?) the TTI Report really indicates that the investigators accepted what data were available from the various states actually used in the study. There was no indication at all of randomness in selecting states to represent certain environments. Hence, any inferences associated with the whole United States are questionable.

The third question (What models were used?) is even more upsetting because apparently the only two models:

a) Texas model for flexible pavements, and
b) Illinois model for rigid pavements

were used to analyze data from several states; for example, Maine and Washington.

In all cases where the models are used on data from other states the results must be questioned. In fact, the only useable results in the study seem to be the Texas model on Texas data and the Illinois model on Illinois data. Hence, the inferences to all other states from these models must be suspect.

Finally, the answer to the last question (Of what value was the study?) is that the TTI did a great deal of work gathering data and good mathematical development but there did not seem to be a well designed statistical approach. it seem that inferences were not carefully considered. That is, before taking the first data point there is no indication of a designed experiment to emphasize exactly what information would lead to overall conclusions for the United States.

Models appropriate to analyze the data from the various states must require certain assumptions. These assumptions do not seem to be stated and this makes the results impossible to accept.

A Final Question

Why was no statistician used on the project when the data and the results are so clearly related to the analysis of messy statistical data?

RECOMMENDATIONS ON RESEARCH ALTERNATIVES

1). One current possibility exists for improving the understanding of traffic and environmental effects on pavement deterioration and the interaction of the load and non-load associated deterioration factors. A careful examination of the AASHO Road Test report (Ref. 1) will indicate that a single combined performance prediction equation is presented for all the data. Data exists from each of the loop-lane combinations at the Road Test and individual equations were produced for each of these loop-lane axle load situations. These were later combined into the overall equation.

It can be noted that each of the axle loads applied at the Road Test did not produce the same damaging effect on the pavement; that is a weighting function was applied so that axle load applications applied during a frozen period, for example, are weighted near zero and axle loads applied during a spring thaw period are weighted greater than 1.0. It is entirely possible that a re-examination of this data with a particular goal of sorting out load and environmentally associated effects and the interaction between these effects, would produce meaningful results. It should be remembered that the original Road Test analysis was primarily done with the goal of sorting out the relative load effects observed in the Test. The data to make these analyses are still available to the AASHO Road Test storage facility in Washington, D. C. and it is estimated that the analysis outlined above could be made for about $50,000.

2) In 1964, in NCHRP Reports 2 and 2A, Irick and Hudson strongly recommended a program of so-called Satellite Road Tests, in which pavements would be observed over a wide range of environmental conditions across the United States (Ref. 24 and 21). That recommendation is still valid since the interaction and separate relationship of load and environmental or climatic associated pavement damage can best be determined by observing pavement performance over a wide range of load, traffic, and climatic conditions. This can best be accomplished with long-term observation of pavement sections over a broad range of environmental and load situations.

That approach was not funded in 1964 by agencies capable of undertaking the study, on the basis that it would "take too long to obtain significant results". In that case, "too long" was 10-15 years. Since this is 1981, it must be noted that 15-17 years of data would have been collected on such sections by the present time and the answer to the question would be at hand if such a study had been undertaken. Factors of time and other relationships not withstanding, no other feasible solution exists to the problem and it is strongly recommended that a program similar to NCHRP 2 and 2A recommendations be undertaken immediately. There is some discussion of a long-term monitoring program in FHWA at the present time. Unless this program is developed with a proper experimenc design, and unless a realistic commitment is given to maintaining the observations over a period of at least ten years, the results of the study will not be useful for the purpose to which it is intended. An extremely strong effort should be given to setting up and administering the long-term monitoring program in order to answer this important question. A proper design and coordination plan could be developed for $50,000.

3) It is must be remembered that the AASHO equations of performance are empirically fitted, multiple regression equation with a complex form which were developed with a multi-staged fitting process. This is, each loop-lane was fitted independently and then combined into the overall equation. These equations were developed with maximum loss of serviceability which could be observed. In "failed" pavements that was to a level of 1.5; in unfailed pavements it was the terminal observed level of serviceability at 1.1 million applications of the applied axle load for the loop-lane.

There is some loss of accuracy in the fitting process as the individual loop-lane equations are generalized, that is, the error-term increases. Then when the factors are substituted into the generalized equation at a particular load level there is variability in using the curves; that is at low terminal psi, the equations are most stable. For higher terminal serviceabilities such as 3 or 3.5, a small portion of the original data are in fact brought to bear and the results can be quite erratic.

Futhermore, the equivalency factors are not in fact unique solutions to the problem since they involve ratios of the equations taken with individual values of load plugged in; in this case, 18 kip single as the base load and any other load for which an equivalency is desired is the alternative load. Examination of the equivalency factors in the AASHTO Design Guide indicates a constant of 1.0 for the 18 kip equivalence and, a variation in the factor based on structural numbers for all other loads. If the base axle load were changed to 1 kip, for example, then the 1 kip equivalency would be constant 1.0 and the 18 kip equivalency would vary with the structural number. It is unfortunate that the users of these equivalencies do not recognize this fact.

It is possible to re-analyze the AASHO Road Test data directly. The individual loop-lane equations could be used and compared in various ways to examine the true variation in observed equivalencies between the various loop-lanes and, therefore, between the various loads. Someone could also recompute the equivalency factors from the general equation using various base-loads to see what the general effect was. We do not really agree that the solution to cost allocation can be found theoretically because there are so many secondary and interacting effects in the real-world that it is impossible to model them with a single mechanistic equation and, in fact, the ultimate deterioration and performance of pavements depends much more on the secondary distress factors than on the primary crack behavior. This analysis could be undertaken for $50,000 - $60,000.

4) In Appendix F we have presented a more detailed experimental design which could be considered to give a true evaluation of load and environmental effects on pavements and pavement damage. This design is presented as a beginning point for more realistic research on load effects.

ASSOCIATION OF
AMERICAN RAILROADS
AMERICAN RAILROADS BUILDING · WASHINGTON, D.C. 20036

INTERMODAL POLICY STUDIES GROUP

MEMORANDUM

TO: Rail Spokesmen

FROM: L. Lee Lane

SUBJECT: Trucking Industry Claims Regarding Environmental Damage to Pavement

DATE: April 28, 1982

As you know, the trucking industry recently commissioned from the Texas Transportation Institute a massive study on the question of the relative responsibility for highway damage of heavy axle-loads and environment. The report, "Effects of Truck Weights on Pavement Deterioration" concluded that no more than half -- and probably much less -- of pavement deterioration is due to heavy axle-loadings. This report is part of a continuing compaign to discredit the AASHO Road Test's implication that heavy axle-loadings are responsible for most highway deterioration.

Since the issue is of great importance, AAR commissioned its own review of the TTI report. A summary of this review, by W. R. Hudson and V. L. Anderson of ARE Engineering Consultants, is attached.

ARE's main conclusions are:

- The TTI report fails to treat the interactive effects of load and climate adequately, resulting in disproportionate assignment of costs to the environment;
- The statistical assumptions, methods and conclusions are highly questionable. In particular:
  - TTI's use of state 'deduct" values for measuring pavement deterioration does a poor job of identifying the causes -- rather than the results -- of that deterioration;
  - TTI's attempt to integrate these widely differing state systems into a single scale is questionable;
  - TTI's implication that its models are valid for the entire U.S. is too ambitious: at best its conclusions are valid for Texas and Illinois only.

The attached summary describes in greater depth the ARE critique of the TTI report.

One positive result of the TTI report is the trucking industry's admission that axle-loadings do cause highway damage -- though the percentage they admit to is far below the assessment of the engineering community.

ASSOCIATION OF
AMERICAN RAILROADS
AMERICAN RAILROADS BUILDING WASHINGTON, D.C. 20036

INTERMODAL POLICY STUDIES GROUP

SUMMARY REPORT:

"AN ASSESSMENT OF LOAD AND ENVIRONMENTAL EFFECTS ON PAVEMENT DETERIORATION"

In September, 1981 the Texas Transportation Institute released an extensive study assessing the relative responsibility of axle-loads and the environment on the deterioration of U.S. highways. This report, "Effects of Truck Weights on Pavement Deterioration," sponsored by the American Trucking Associations, Inc. and the Motor Vehicle Manufacturers Association, concluded that the greater part of pavement deterioration is due to environmental effects rather than heavy axle-loadings.

In response, the AAR commissioned a review of the TTI study by W.R. Hudson and V.L. Anderson, of ARE, Inc. Engineering Consultants of Austin, Texas. This paper is a summary of their evaluation of the TTI report.

Hudson and Anderson found two main defects in the TTI study:

- The treatment of the interactive effects of load and environment on pavement is highly questionable, leading to disproportionate assignment of costs to the environment;
- The statistical assumptions, methods and inferences accepted by TTI are highly questionable.

Failure to Treat Interactive Effects Adequately

The TTI report recognizes that pavement distress types may be due to loads, environment or combined causes. TTI categorizes each symptom of distress -- such as pavement rutting, cracking, swelling or spalling -- according to one of these three categories. The study appears to recognize the fact that a major part of road damage is neither from the environment alone nor from axle-loads but from the interaction of these factors. Unfortunately, the share of damage attributed to combined effects is far too small.

The importance of interactive effects derives from the fact that, as the ARE report states, "interactive and combined effects really add to or intensify the axle-load effect." The TTI report fails to recognize this primary characteristic of interactive effects. As a result:

- It categorizes a number of important distress symptoms as primarily environmental when, in fact, they cause damage only or largely in the presence of axle-loads;
- For a large number of remaining distress types, there is either no consensus as to the cause of the distress or the distress symptom could have multiple causes, some load-associated, some not.

In the first category, ARE points out that:

- Durability cracking, which in one part of the TTI report is listed as caused by the environment, is later found by TTI to be severely aggravated by the increased "amount of spalling by heavy truck wheels."

- Swelling and bumps, both listed as distresses resulting from environmental causes, are really due to interactions between materials and the environment.
- Frost action "on pavement is greatly dependent on applied loads." The ARE report states that "we do not believe that road heave or swell due to frost can be termed entirely environmental... because the consequences clearly involve heavy load interactions," as shown by spring load limits in many states.
- Meandering cracks may be due to any number of causes, not just environment. Further, it is an inadequate concept which "does not...widely appear as generalized damage or distress functions in pavement."
- Blow-ups, also listed as environmentally caused (the result of temperature swings), generally do not occur in properly designed pavement "until it has been weakened by load damage and/or it has been modified by many years of service."

ARE summarizes by saying that:

> only pavement distress due to temperature shrinkage, swelling clays and occasional meandering cracks seem to be chargeable to environment alone. All other pavement distress types outlined by TTI...have at least some load associated interaction or combined effects...

Improper Statistical Treatment of the Data

TTI's methodology depends on an analysis of pavement distress surveys performed in 14 states. In these surveys, stretches of pavement are examined and each instance of deterioration is assigned a "deduct value." That is, the distress sympton is weighted according to the type of distress it is, its depth and the area of road it affects.

For every distress type, TTI attempted to take its deduct value, multiply it by its frequency of occurence and assign it a cause: axle-loads, the environment or a combination of the two.

The result, presumably, is the total U.S. highway damage due to the environment, axle-loads or both. As we have just seen, many of the distress types thought by TTI to be due to environment alone are really due to interactive effects. But even if all distress types had been properly categorized and interactive effects given their proper weight, ARE finds that TTI performed mathematically questionable operations on these compilations of deduct value data. The shortcomings are of three kinds:

- The deduct system was never intended to correlate distress symptoms with causes of distress, but is rather a measure of pavement quality and condition;
- TTI's "normalization" of the differing state deduct value systems is questionable;
- TTI implies that from its models valid inferences for the entire United States can be made. In fact, even if the deduct system data base were adequate, the inferences would be valid only for Texas and Illinois.

Deduct systems are inappropriate measures of the causes of distress for several reasons. The most important is that they are primarily oriented toward telling maintenance engineers when patching or resurfacing is required -- not why the repair is necessary. So, the categories of distress are geared toward pavement management and action, not identifying causes.

Secondly, since distress symptom categories have been created for purposes unrelated to identifying the causes of pavement distress, different and combined causes are possible for the same distress symptom. There is no one-to-one correlation between distress symptoms and causes.

Third, higher deduct values are frequently given to distress symptoms which require immediate action to avoid future costs -- not because the present damage is so severe or costly. For example, alligator cracks, while themselves reducing the serviceability of a road very little, may receive high points since future axle-load applications will soon cause rutting.

Even if deduct systems were cause-oriented, the systems used vary from state to state. Both the values assigned to distress symptoms vary, and the distress symptom categories vary. Spalling may be in one state's list of symptoms, but not in another's.

TTI recognized the need to "normalize" the data to avoid a problem of comparing apples from Washington with oranges from Florida. Was this effort successful? According to ARE:

- "To obtain an overall deduct evaluation... requires a composition of different [deduct] scales...the scales are different for each state...there is not a common data base across all states in the TTI study."

- "A combination of distress and weighting factors are used; then they are converted to a structural rating value...and a total distress deduction...is arrived at. These are further converted into some fraction of visual distress deduction by a ratio of load deduct points to total deduct points times the factor 1.216.

  "We believe that this successive large number of arbitrary indexing conversions makes the original 'data' very difficult to follow, and in many ways basically useless for the intended purpose."

- TTI related this deduct data to 35 U.S. climatic zones. ARE states that "the information gathered from each location was put into Program PAVDEDUCT...It must be pointed out that these are not response variable data at all, but rather are obtained from calculations in a computer program, and may not relate at all to 'reality' for these locations."

- ARE's statistical review of the study showed that of 17 distress types, "the load-distress category really revolved around [two of] the variables 1) alligator cracks and 2) rutting only. This seemed very unreasonable..."

- Finally, ARE notes that the same "weighting functions, deduct values and other data in the TTI Report could be used to make findings" in which "50-80% [of deduct points] are directly associated with load effects" using a far simpler methodology than that used by TTI.

Even if TTI's methodology were sound, how widely should its conclusions apply? The report derives a large part of its importance from the implication that its conclusions are valid for the United States as a whole. ARE finds on the other hand, that:

> In reality, the results are only appropriate for flexible pavement in Texas (that is using the Texas model on Texas data) and for rigid pavements in Illinois (using the Illinois model on Illinois data). To try to allow the results to apply to all states in the continental United States (or even to those states in which flexible pavement data were obtained and subjected to the Texas model or...rigid pavement data...put in the Illinois model) is definitely questionable because any statistical model is only applicable within its own inference space.

The primary reason is that to try to correlate the deduct data on the one hand and the climate data on the other, as TTI did,

> one must have at least two levels of a factor to obtain an estimate of a main effect. In addition, these must be at least two levels of each of two factors to obtain an estimate of a two factors interaction effect. In the example cited on Illinois...there is only one level of environment namely "Illinois," hence there can be no estimate of environment nor an estimate of the interaction of load by environment.

TTI itself acknowledges that "unfortunately, none of the climatic variables entered into the model due to the small range of climatic conditions in Illinois."

In conclusion, ARE states that the TTI report categorizes a number of distress types as caused by environment when they are actually interactive effects or have multiple causes. It fails to recognize that deduct systems categorize symptoms rather than causes, it uses an oversimplified procedure for normalizing deduct values from state-to-state, and it draws overly ambitious conclusions for the entire U.S. from a model that is applicable to only two states.

ARE Inc—ENGINEERING CONSULTANTS
DESIGN • RESEARCH • ANALYSIS • EVALUATION

January 25, 1982

Ms. Fran Larkin
State Highway Analyst
American Association of RailRoads
American Railroads Buildings
Washington, D. C. 20036

Dear Frances:

In accordance with your letter dated 28 December, I am providing you herewith my review of the "Summary Analysis of Effects of Truck Weights on Pavement Deterioration," which was prepared by the American Trucking Association. I am happy to provide you with this letter report of my review, I am sorry that some unexpected travel and surgery in my family has delayed your receipt of this document. I hope you find it helpful.

While the ATA summary on the surface purports to be an unbiased summary, a more careful examination seems to indicate it was more likely written or edited by the press agent or the advertising department rather than by a technical group within ATA. Phraseology, like "...beset with misinformation and strong emotion...", "...heavy trucks to be cast in the role of the villian..." and "...this deceptively simple question..." lead toward this idea. While the ATA summary purports to give "...a brief commentary on the study - it's background, it's methods, it's findings and their meaning", it in fact intersperses into the seven page write-up a highly colored and biased commentary on the study while in fact giving little or no precise review of the TTI study.

ATA suggests that "....the research team adopted a conservative approach and where there was doubt about the attribution, the distress was classified as a combined load-climate effect." As previously discussed in our report RR1/3 dated December, 1981, we do not think such statements about a conservative approach are correct, nor in fact meaningful. If truth is sought, the best approach is one yielding most nearly the facts

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and the term "conservative" is inappropriate.

On page 3 and 4 the ATA study indicates "...the results of this study also show that when pavements are loaded greatly in excess of the design capability, only then does load-related distress tend to dominate - a finding that is consistent with observations of the AASHO Road Test." I am not aware of any of the Road Test data that makes such a clear statement or even a similar inference.

On page 5 ATA suggests "...the analysis performed by the contractor (TTI) clearly demonstrates that the form of the AASHO equations may be faulty and can lead to unreliable results if used as predicters of long term performance." In my opinion this statement is misleading but the operative word is possibly "may be faulty" rather than the more positive "is faulty". What TTI actually shows, or rather points out, is that when fitting equations to any data which is bounded in the vertical direction by finite limits such as zero and five (as for PSI) but which is unbounded along the other axis as in the case of time or accumulated axle loads for the pavement performance curve; it is likely that the data will be asymptotic to the upper and lower boundaries (in this case zero and five). Such a curve is the S-shaped curve discussed by Lytton.

First of all this entire question is complicated and could be discussed for many pages. While I agree that the S-shaped curve may ultimately be the most appropriate there is nothing that demands an S-shaped curve. Many people have observed pavements that started at the highest serviceability just after construction and immediately began to lose serviceability as illustrated in Attachment 4 (Figure A). At the AASHO Road Test many of the flexible pavements exhibited this kind of behavior, while the rigid pavements tended to exhibit the behavior shown in the dashed line early in their life. Since most of us have never seen a pavement with a serviceability actually as low as zero there is no particular reason to suggest that the curve could not drop to zero directly as illustrated by the dashed line.

On the other hand, what has been seen in several real world cases is that maintenance modifies the shape of the PSI curve and it has been shown in Texas and by the Darter data for the Illinois test sections that an acceptable serviceability level can be maintained for long periods of time if enough maintenance is provided. The dotted or S-shaped curve results (see Figure A also).

While all of this is interesting it is academic for the study at hand since the Federal Highway system is designed, constructed and maintained with a minimum serviceability level of 2.5 or 2.0 in mind. Thus, the shape of the curve developed by Irick, et al, at the Road Test and subsequently analyzed by the Asphalt Institute and others is adequate for common use. Those familiar with the use and analysis of empirical data are all aware that any equation or model is in fact confined to some degree by a particular form of the equation used and this limitation is taken into account by limiting the portion of the curve which is used in practice. That is the "inference space" or factor space is confined to the area over which observations were actually made.

Thus, in no way, in my opinion, does the TTI Report suggest that the AASHO Road Test data or analyses are faulty or unuseable. It does suggest that improvements to the analysis can be made and this is a valid recommendation.

We do concur with the general idea conveyed at the bottom of page 5 in the ATA summary (although perhaps not with its "urgency"), that a reevaluation of the Road Test data are in order, using current knowledge and analytical tools. In fact, we have made these recommendations to several groups, including NCHRP and FHWA, over recent years.

Two Sets of Conclusions exist for Chapter VII to the TTI Report. The first set were provided in a copy of the report which we received in early fall 1981. The second set occur in a copy of the report provided to us by TTI at a meeting with the Texas DHT in late December, 1981. A copy of both sets of conclusions are attached, as attachments 1 and 2 respectively, to this letter report.

Assuming that the longer set of conclusions is more complete and intended to be the correct and latest set we have sorted the statements out in a slightly different fashion and have listed them in attachment 3 in 1,2,3 order. In this context we seem to find 7 conclusions, one brief restatement of the summary and a commentary statement about the subject of apportioning costs of maintenance and rehabilitation, (although that does not seem to be the main purpose of the original TTI Report). Likewise, we have attached to this restatement of the specific findings of the TTI Report two tables which Dr. Lytton described in the December meeting mentioned above as the specific estimates of the proportion of damage ascribable to 1) load 2) climate and 3) combined influences outlined in summary item 5 of attachment number 3.

It may be a minor distinction but it seems important to us that while the report by TTI is entitled, "Effects of Truck Weights on Pavement Deterioration" and while that subject along with climatic effects on pavement deterioration are treated in the ATA summary, the TTI conclusions themselves seem, in fact, to be dealing with "decisions to maintain or rehabilitate a pavement". For example, summary item 1, summary item 3, summary item 4, and summary item 5 all talk about decision criteria, and decisions to rehabilitate or maintain. It is our opinion that the subject of "effects of truck weights and climate on pavement deterioration" is broader than the subject of decision criteria for maintenance and rehabilitation activities. This latter item is a major factor in pavement management systems at the network level, an area in which I have worked and published widely over the last 15 years.

On page 7 of the its report, ATA outlines four "significant conclusions that can be drawn (from the TTI Report)". Those are restated as follows:

- Climatic forces acting independently of traffic are more destructive of pavements than the effects due to traffic combined with climate.

- Short duration tests of the effects of traffic loads on pavements, such as the AASHO Road Test, cannot provide a reliable basis for projecting the long term performance of adequately designed pavements.

- When accumulated traffic loading in ESALs reaches the design level of loading, the average pavement distress due to traffic and to traffic combined with climate averages less than one-half of the total amount of observable pavement damage, and it may be

- There is urgent need for a comprehensive reevaluation of the AASHO Road Test basic data using modern axle weight/pavement response techniques and including reassessment of axle load relationships which apply to pavements of adequate strength.

While this seems to be four summary items it really is basically only two since the first and third items listed are really two sides of the same coin. The first item is a little misleading since it is not clear (although it seems to be implied) whether the effects due to "traffic combined with climate" is intended to mean 1) traffic, plus 2) traffic combined with climate effects, the two categories used by TTI; or just the latter "combined" category. The third item merely presents the other half of the coin and suggests that the effects of 1) traffic and 2) traffic combined with climate, averages less than one-half of observable pavement damage. In these two items ATA seems to perhaps be saying "heads I win, tails you lose".

We believe Lyttons results are best summarized and presented, (as he suggested to us in December) in Tables 6 and 7 from his report (pages 57 and 59, Attachment II). It is not really possible to obtain a weighted average from these tables, but the largest "minimum" value shown (Table 6) exceeds a 50% damage ratio for 9 of the 19 categories, and in Table 7 the largest "maximum" value shown exceeds a level of 66%. A more precise summary is not easily presented. However, it seems that ATA has overstated the case. As outlined in our previous reports, we feel the true percentages are higher.

Likewise, the second and fourth items seem to relate closely to each other, in the second item basically they state that short duration tests cannot provide a reliable basis for projecting long term performance. This is certainly not a clear cut direct statement made in the TTI Report, although it might be implied because of lack of long term climatic effects. On the other hand, the TTI Report seems more concerned with the form of the AASHO Road Test equation as indicated in what we have called item 7 of their conclusions. On the fourth item there is agreement, at least in the two reports that the AASHO Road Test data can usefully be reanalyzed, the TTI Report is primarily concerned with the shape of the curve while the ATA is more concerned with "...a reassessment of axle load relationships which apply to pavements of adequate strength." Again, the method and words used in making the statement by ATA gives implications to the TTI Report, which in my opinion do not exist.

Finally, there is a major disagreement between the ATA summary and the TTI Report which, although not stated as such, is presented in the last paragraph on page 7. In this paragraph ATA points out strongly "its results (the TTI Study) therefore, should not be used to justify a correction factor to be applied to or to 'patch up' a consumption theory approach to cost allocation...". In the first paragraph of its conclusions TTI seems to clearly set the stage for using the consumption theory "...the use of the consumption theory of cost allocation requires that costs of rehabilitation and maintenance should be alloted to classes of vehicles based upon the amount of damage...", they further point out later that the consumption theory of cost allocation must incorporate complex and meaningful, physical equations in its determination of cost formulas. In this case, at least the sponsors and the researchers seem to be in indirect conflict with each other.

I have tried to objectively compare the ATA Summary and the TTI report as I read and understood it. I hope this is a useful summary of that comparison. In general, I feel that the ATA summary overstates the findings of the TTI Study in many respects. In concise terms I believe the TTI report states that climate, indeed, has a big effect on pavement deterioration; however, there is no corollary that trucks have a small effect, since much of the effect is combined or interactive.

I hope this summary is useful for you, and I will be glad to discuss it with you or others in more detail at any time.

Cordially yours,

W. R. Hudson

W. R. Hudson

WRH/tas
Attachments

From TTI Report
Version dated Dec., 1981

ATTACHMENT I

1 of 2

CHAPTER VII

CONCLUSIONS

The subject that is addressed by this report is complex. The use of the consumption theory of cost allocation requires that costs of rehabilitation and maintenance should be allocated to classes of vehicles based upon the amount of damage that they do that occasions the expenditure of funds for repairing or reconstructing roads. As shown in this report, the damage that results in a decision to maintain or rehabilitate a pavement is not ascribable to load alone but in some cases is entirely dependent upon climatic influences and in other cases is the result of the combined effect of these two.

The pavement distress and performance equations presented in Appendices E, F, and H show that the interaction of load and climate is complex and that the consumption theory of cost allocation, in order to be in accord with both equity and physical reality must be prepared to incorporate this complexity into its determinations of cost formulas.

It is also apparent that at the present time there is no consensus among the States about what types of distress should be considered or how heavily each should be weighted in determining a decision criterion for maintenance and rehabilitaion activities. But despite the lack of consensus, it is evident that in the estimation of all of the States, climatically - caused distress figures heavily in their decision making in developing a pavement maintenance and rehabilitation program for the State highway networks. Estimates have been made of the proportions of the decision to rehabilitate that can be ascribed to loads, climate, and combined influences.

From TTI Report

2 of 2

Presumably, these estimated proportions should be reflected in the apportioning of costs of maintenance and rehabilitation. That proportion that is due to loads should be borne by the load classes in proportion to the relative amounts of damage that they do. That proportion that is due to the climate should be shared among all vehicles in a given traffic stream in such a way that it reflects the fact that the load of the vehicle plays no part in that proportion of the total damage. Presumably, this can be done by treated the climatically- caused proportions of damage as a common cost to be shared equally among all vehicles.

The proportions change with the climate, the traffic level, the specific type of pavement under consideration, and the quality of construction and routine maintenance as is shown most strikingly in the study of rigid pavement damage that is presented in detail in Appendix F.

As stated before, this is a complex topic, and it is one that can be addressed successfully only with a careful consideration of the diverse causes of pavement damage, only one of which is the level of load which passes over the pavement.

ATTACHMENT II

Received from Lytton
December 15, 1981
1 of 4

CHAPTER VII

CONCLUSIONS

The subject that is addressed by this report is complex. The use of the consumption theory of cost allocation requires that costs of rehabilitation and maintenance should be allocated to classes of vehicles based upon the amount of damage that they do that occasions the expenditure of funds for repairing or reconstructing roads. As shown in this report, the damage that results in a decision to maintain or rehabilitate a pavement is not ascribable to load alone but in some cases is entirely dependent upon climatic influences and in other cases is the result of the combined effect of these two.

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Presumably, these estimated proportions should be reflected in the apportioning of costs of maintenance and rehabilitation. That proportion that is due to loads should be borne by the load classes in proportion to the relative amounts of damage that they do. That proportion that is due to the climate should be shared among all vehicles in a given traffic stream in such a way that it reflects the fact that the load of the vehicle plays no part in that proportion of the total damage. Presumably, this can be done by treating the climatically-caused proportions of damage as a common cost to be shared equally among all vehicles.

The proportions change with the climate, the traffic level, the specific type of pavement under consideration, and the quality of construction and routine maintenance as is shown most strikingly in the study of rigid pavement damage that is presented in detail in Appendix F.

In the course of this study and other studies as well, as noted in the text of this report, the form of equation that is used in the AASHTO design equations was inappropriate to predict long-term trends in serviceability index and most types of distress. In order to correct this discrepancy, the long-term data that have been collected on the AASHTO Road Test sections which have remained in service need to be analyzed using the sigmoidal (S-shaped) curve form which is appropriate for long-term pavement performance. An example of such an effort is shown in Appendix F in which the long-term performance of 175 jointed reinforced concrete pavement sections, including 22 from the original AASHTO Road Test, is analyzed.

As stated before, this is a complex topic, and it is one that can be addressed successfully only with a careful consideration of the diverse causes of pavement damage, only one of which is the level of load which passes over the pavement.

TABLE 6. Range of Minimum Damage Ratios for 10-Million 18-kip Equivalent Single Axle Loads*

Climate Zone	Flexible Pavement	Overlaid Flexible Pavement	Jointed Concrete Pavement*	Overlaid Jointed Concrete Pavement+
I	0.45-0.62	0.35-0.53	0.10	--
II	0.42-0.60	0.30-0.52	0.10	--
III	0.01-0.68	0.26-0.58	0.13	0
IV	0.50-0.51	0.35-0.45	0.13	--
V	0.45-0.60	0.27-0.49	0.14	--
VI	0.47-0.59	0.26-0.49	0.16	--

*Exclude results from Louisiana and Georgia.

*Computed for 20-million 18-kip ESAL.

+Computed for Maine, Minnesota, and Washington using the Minnesota composite pavement equation.

TABLE 7. Range of Maximum Damage Ratios for 10-Million 18-kip Equivalent Single Axle Loads*

Climatic Zone	Flexible Pavement	Overlaid Flexible Pavement	Jointed Concrete Pavement†	Overlaid Jointed Concrete Pavement*
I	0.69-0.72	0.56-0.67	0.44	--
II	0.42-0.84	0.30-0.79	0.47	--
III	0.42-0.81	0.26-0.69	0.44	0.33
IV	0.69	0.67	0.41	--
V	0.47-0.72	0.27-0.67	0.41	--
VI	0.47-0.73	0.26-0.69	0.43	--

*Computed for Minnesota using the Minnesota composite pavement equation.

†Computed for 20-million 18-kip ESAL.

Extract of Revised
Conclusions - TTI
Report RF 4087-2

ATTACHMENT III

SUMMARY OF TTI "CONCLUSIONS"

1 of 2

Conclusions

1. "The damage that results in a decision to maintain or rehabilitate a pavement is not ascribable to load alone but in some cases is entirely dependent upon climatic influences and in other cases is the result of the combined effect of these two".

2. "The interaction of load and climate is complex and the consumption theory of cost allocation, in order to be in accord with both equity and physical reality must be prepared to incorporate this complexity into its determinations of cost formulas".

3. "...at the present time there is no consensus among the States about what types of distress should be considered or how heavily each should be weighted in determining a decision criterion for maintenance and rehabilitation activities".

4. "...it is evident that in the estimation of all of the States, climatically-caused distress figures heavily in their decision making in developing a pavement maintenance and rehabilitation program for the State highway networks".

5. "...estimates have been made of the proportions of the decision to rehabilitate that can be ascribed to loads, climate, and combined influences".

6. "The proportions change with the climate, the traffic level, the specific type of pavement under consideration, and the quality of construction and routine maintenance..."

7. "in the course of this study and other studies as well, as noted in the text of this report, the form of equation that is used in the AASHTO design equations was inappropriate to predict long-term trends in serviceability index and most types of distress".

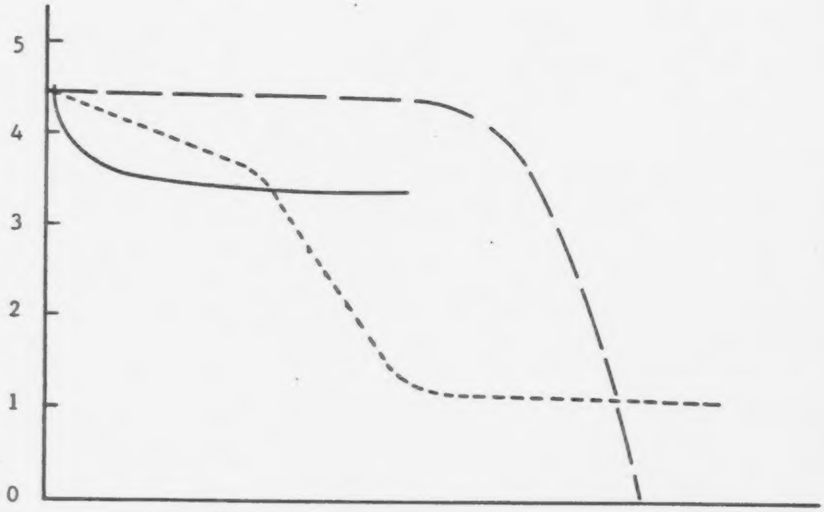
Summary 2 of 2

1. "As stated before, this is a complex topic, and it is one that can be addressed successfully only with a careful consideration of the diverse causes of pavement damage, only one of which is the level of load which passes over the pavement".

Commentary

1. Presumably, these estimated proportions should be reflected in the apportioning of costs of maintenance and rehabilitation. That proportion that is due to loads should be borne by the load classes in proportion to the relative amounts of damage that they do. That proportion that is due to the climate should be shared among all vehicles in a given traffic stream in such a way that it reflects the fact that the load of the vehicle plays no part in that proportion of the total damage. Presumably, this can be done by treating the climatically-caused proportions of damage as a common cost to be shared equally among all vehicles.

ATTACHMENT IV



Time or $\sum$ Traffic

Figure A

Summary Analysis
of
Effects of Truck Weights on Pavement Deterioration
by the
American Trucking Associations, Inc.

The American Trucking Associations and the Motor Vehicle Manufacturers Association are pleased to release the final report of a major study conducted by the Texas Transportation Institute entitled: Effects of Truck Weights on Pavement Deterioration. The sponsors chose the TTI to conduct this study because of their objectivity and expertise on the subject.

The basic objective of this research was to evaluate the relative contributions of load and non-load (climate and environmental) factors on the deterioration of highway pavements. While the objective is simple to state, the research itself was highly complex. We believe, therefore, that a brief commentary on the study—its background, its methods, its findings and their meaning—will provide a useful supplement to the details presented in the report. The entire report should be read for a full appreciation of the scope and importance of the work accomplished by TTI.

The issue of pavement deterioration and its causes is both an important public concern and one which, unfortunately, is beset with misinformation and strong emotion. It is not uncommon, for example, for "heavy" trucks to be cast in the role of the villain that is causing our highways to break up prematurely and wear out at an alarming rate. But what are the facts? This deceptively simple question opens a very complex subject that does not admit of any simple or easy answers. The research undertaken by TTI represents, in our opinion, an extremely significant advance toward a fuller understanding of this problem. It doesn't have all the answers, and the report is not easy to assimilate "in one gulp." Some of the results, furthermore, challenge some widely accepted notions and will not be welcomed by those who may have closed their minds on the subject.

In a very fundamental sense, the research was concerned with clarifying what is the normal wear and tear of highway pavements, and in assessing the relative effects of truck weight and other forces acting upon pavements. What is provided, we believe, is a careful and factual analysis of what happens to pavements under normal conditions. The results do not support the charges so often levied against trucks as "the culprit" in highway deterioration. In certain respects, as stated in the report, the analysis tends, if anything, to overestimate the effects of truck weight on pavement deterioration.

The complexity of the problem stems directly from the very large number of variables to be dealt with as well as from the manifold (and not completely understood) interactions among them. Included are variations in pavements themselves, their types, materials and construction, strengths and ages; in the numerous forms of pavement distress and the extent and severity of each type of distress; in climate, weather and other environmental forces, including use of road salt, other chemical action, ground water, drainage, temperature changes, and a host of other related conditions; in traffic loadings, including both design levels and actual loadings over the life of the pavement from all classes of vehicles and different axle weights; and in state policies and practices concerning pavement sufficiency ratings and in the timing, extent and character of maintenance and rehabilitation activities. It should not be surprising to find, as the study reveals, rather wide variation in the amount of pavement deterioration that can be attributed either wholly or in part to traffic loading.

What is an extremely important finding of this research, however, is that when pavements have accumulated traffic loading equal to their design load capability (i.e. the intended normal service life), the amount of pavement distress directly attributable to traffic and to traffic acting in combination with environmental factors averages less than one-half of the total and in some cases is much less. The remainder of the total distress is caused by environmental or non-load-related factors! The results of this study also show that when pavements are loaded greatly in excess of their design capability only then does load-related distress tend to dominate - a finding that is consistent with observations of the AASHO Road Test.[*]

The research itself encompassed both empirical and analytical assessments. The empirical side involved two basic elements. First, and of central importance, is the circumstance that each of the many different forms of pavement damage or distress exhibits characteristics which reveal the underlying causes of that distress. The technical literature supports these fundamental classifications. While there are cases in which competent observers may disagree on the causal factors, it is generally the case that the identification is clear cut and an assignment may be made that attributes the particular form of distress to either traffic load forces, climate (here taken broadly to represent the collective effect of non-load-related forces), or a combination of load and climate acting together. In the present study the research team adopted a conservative approach, and where there was doubt about the attribution, the distress was classified as a combined load-climate effect. The combined-effect designation represents a rather wide band, and it should be viewed as representing approximate upper and lower limits of the effects of traffic loads. Further research is needed to identify more precisely the relative contribution of load and non-load forces where there is interaction between them.

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[*] An experimental testing of highway pavements conducted in Illinois in the early 60's by The American Association of State Highway Officials (now American Association of State Highway and Transportation Officials).

The second aspect of the empirical work involved application of the pavement sufficiency rating systems employed by the individual states, where available, to guide their scheduling of maintenance and pavement rehabilitation efforts. The different ratings assigned by different states to each form of distress, therefore, may be considered a measure of significant regional differences in its relative importance. It must be noted, however, that to some extent state pavement evaluation programs may also represent policy or administrative decisions rather than real differences in pavement performance.

The heart of the entire study, however, involved the analytical modeling of the primary causes of the different types of pavement distress. This also had two separate aspects, the first part of which consisted of a critical review of the model of pavement distress and performance equations derived from the AASHO Road Test. The analysis performed by the contractor clearly demonstrates that the form of the AASHO equations may be faulty and can lead to unreliable results if used as predictors of long term pavement performance.

The above represents a conclusion of major significance with far reaching implications, but it should not be construed as a condemnation of the AASHO Road Test itself. It does, however, caution that the role of the original road test equations is limited to pavement design considerations, where practical experience can be, and is being, used to adapt them to varying conditions. Most important, however, is that this analysis should convey a clear signal to the highway engineering community of the urgent need for a formal reevaluation of the basic AASHO Road Test data using the latest technical tools and professional expertise.

Perhaps the most far reaching implication of this analysis relates to the individual axle load relationships derived from the Road Test. Other research results are already showing that these relationships are a function of pavement strength, and that they cannot be assumed to be roughly equal for all pavements — as is currenty done in equivalent single axle load computations. This issue must be addressed in any reevaluation of the Road Test data if the best possible pavement performance relationships, incorporating both traffic and environment, are to be developed.

The main body of the analytical work involved the application of structural models, developed by the contractor, based on the physical properties of asphalt pavement materials. These models were used with the classification of pavement distress by cause and the state pavement sufficiency ratings to project the three categories of pavement distress for three levels of traffic loading. Since no comparable structural models were currently available for concrete pavements, the contractor used a statistical study performed by researchers at the University of Illinois for a similar analysis of concrete pavements. The results of these analyses are presented in the report in a series of tables. While these tables show a significant variation in the amounts of distress attributable to load and to load interacting with climate, there are a number of highly significant conclusions that can be drawn:

- Climatic forces acting independently of traffic are more destructive of pavements than the effects due to traffic combined with climate.
- Short duration tests of the effects of traffic loads on pavements, such as the AASHO Road Test, cannot provide a reliable basis for projecting the long term performance of adequately designed pavements.
- When accumulated traffic loading in ESALs reaches the design level of loading, the average pavement distress due to traffic and to traffic combined with climate averages less than one-half of the total amount of observable pavement damage, and it may be considerably less.
- There is urgent need for a comprehensive reevaluation of the AASHO Road Test basic data using modern axle weight/pavement response techniques and including a reassessment of axle load relationships which apply to pavements of adequate strength.

Finally, a comment on the relevance of this research for highway cost allocation studies is in order. First, this research clearly demonstrates that the attribution of pavement wear and damage exclusively or even primarily to heavy truck traffic is not supportable. The broader question, however, of what constitutes a fair and equitable method for allocating highway costs among the various classes of users is not addressed by this research. Its results, therefore, should not be used to justify a correction factor to be applied to or to "patch up" a consumption-theory approach to cost allocation that is itself subject to challenge on more fundamental grounds.

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August 10, 1982

TESTIMONY OF HARRIET HOLTZMAN-PARCELLS
BEFORE THE
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
CONCERNING
CAUSES OF HIGHWAY DETERIORATION AND PROPER ALLOCATION OF COST RESPONSIBILITY
PRESENTED ON BEHALF OF:

Environmental Policy Center
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The Central States Resource Center
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I would like to thank the Chairman and members of the Committee for the invitation to testify before the Committee on the causes of highway deterioration and proper allocation of cost responsibility among the various classes of vehicles using the highways. My name is Harriet Holtzman-Parcells and I am presenting this testimony on behalf of the Environmental Policy Center, a private non-profit organization working for the protection and environmentally use of our nation's energy resources, and on behalf of the following non-profit organizations which share the views expressed herein:

- The Central States Resource Center in Illinois
- Friends of the Earth
- The National Association of Railroad Passengers
- The National Wildlife Federation

I. CAUSES OF ROAD DETERIORATION: ROLE OF HEAVY TRUCKS IN ACCELERATING HIGHWAY WEAR:

The deteriorating state of the nation's highways has been well documented. In its report to Congress, Status of the Nation's Highways: Conditions and Performance (January 1981), the federal Department of Transportation(DOT) stated that conditions on all federally-aided highways have declined. By 1978, over 55 percent of the mileage for each type of highway, except the Interstate, was in "fair" or "poor" condition. Mileage in "poor" condition on the Interstate more than doubled from 1975-1978 and mileage in "good" condition declined by 11 percent. DOT estimated that an average annual federal investment of $5.2-5.9 billion (1979 dollars) is required to maintain current conditions on the federal-aid system (see Appendix A).

Given the deteriorating state of our nation's highways, let us examine the causes of road wear. While road deterioration stems from many factors, including weather and natural aging process, use (the amount and weight of traffic using the road) is the critical factor because pavement damage increases exponentially with increases in vehicle weight. This relationship was established by the American Association of State Highway Officials (AASHO) Road Test, a test mandated by Congress in 1956 to generate detailed information about highway wear for the purposes of designing the Interstate System. The Road Test provided a tool for pavement design by establishing the amount of stress that could be borne by pavements before reaching the end of their "serviceable" life. It demonstrated that pavement damage increases very rapidly with small increases in vehicle weight, and more specifically, with increases in axle weight. A Fourth Power Rule was derived which states that pavement wear increases exponentially to the fourth power with increases in vehicle weight (see Figure 1).

The common denominator of vehicle impact is the Equivalent Single Axle Load (ESAL). The standard is a single axle load of 18,000 lbs. which equals 1 on the ESAL scale. An automobile axle has the comparative impact on a road of .0004 ESAL, while a 20,000 lb. axle on a truck has the impact of 1.57 ESAL. Because of the exponential increase in damage with increases in weight, a 5 axle 80,000 lb. truck weighs about as much as 20 automobiles but has the impact of approximately 9,600 automobiles (see Figure 2).

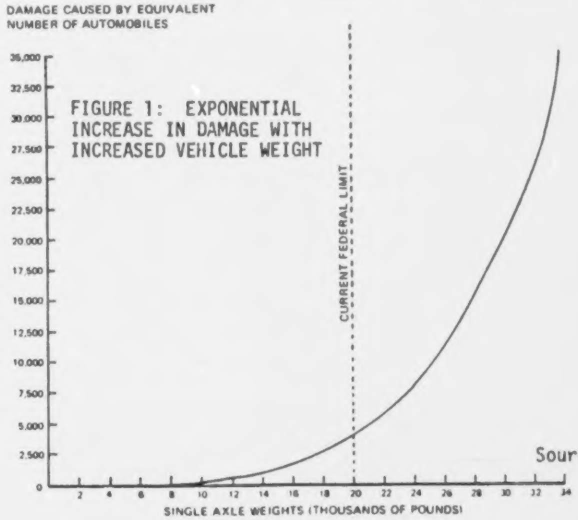
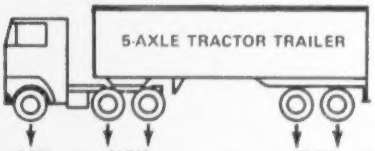


FIGURE 1: EXPONENTIAL INCREASE IN DAMAGE WITH INCREASED VEHICLE WEIGHT

Source: Reference 1

FIGURE 2

EQUIVALENT DAMAGE CAUSED BY LOADED
5-AXLE TRACTOR TRAILER



TRUCK AXLE WEIGHTS	12,000 POUNDS	+	34,000 POUNDS	+	34,000 POUNDS	=	80,000 POUNDS
EQUIVALENT NUMBER OF AUTOS	500 AUTOS	+	4,550 AUTOS	+	4,550 AUTOS	=	9,600 AUTOS

Source: Reference 2

Roads are designed to carry a specific impact over their lifetimes. When a road is designed it is based on a 20 year projection of the numbers and weight of each vehicle class that will be using the highway. Increases in the numbers and weight of vehicles beyond the projection used in determining design life will have the effect of accelerating deterioration.

The growth rate of heavy trucks has been much greater in the past decade than that of automobiles. In 1969, automobiles were 82 percent of the traffic stream, while combination trucks were about 7 percent. By 1979, automobiles had decreased to 69 percent of all traffic while combinations had grown to 11 percent. Most importantly, the heaviest trucks have doubled their numbers. DOT has recognized the impact that the growth in trucks has had on the Interstate System.

> The Interstate was designed and constructed based on travel estimates that underestimated the enormous popularity and use of the system, particularly the growth of the long distance trucking industry...this intensity of use caused useable design life to be reached sooner than anticipated on many segments.

DOT has estimated that trucks will continue to grow at double the rate of autos (5.5% vs. 2.4% respectively) in the years ahead. Trucks have also gotten larger and heavier. In 1974, the federal government "permitted" truck weights to increase to 80,000 lbs. gross vehicle weight and axle weights were also permitted to increase(from 18,000 to 20,000 lb. single axle and from 32,000 to 34,000 lbs. tandem axle). In recommending the increase, DOT recognized the impact this would have on our highways:

> The Department of Transportation and AASHTO acknowledged that there would be consequential reductions in highway serviceability of approximately 20%.

Funds to repair the nation's highways and bridges fall far short of the need. This results in deferred maintenance and ultimately, to increased costs, not savings. A 1979 report of the Transportation Research Board states:

> Pavement and bridge structures may undergo accelerating deterioration as defects go uncorrected, with the accumulated cost of repair increasing geometrically over time. Where such conditions exist, the deferment decision represents an added cost rather than savings to the highway agency. The impact is compounded by the added user costs and inflationary effects of delay on repair costs.[3]

The existing tax structure is not adequately assessing the various classes of vehicles using the highways for the costs they incur.

II. COST RESPONSIBILITY OF VEHICLE CLASSES USING THE HIGHWAYS

States across the country and the federal Department of Transportation have been conducting highway cost allocation studies in recent years to determine if highway costs, such as construction, repair and structure costs, are equitably distributed among the various classes of vehicles using the highways.

Most studies have followed a variation on the "incremental method" of cost allocation. The basic principle underlying this method is that certain highway costs are incurred specifically to accommodate vehicles of different sizes, weights and axle loadings. These expenditures are "attributed" to these vehicles and assigned to them. Other expenses which are not clearly linked to any particular vehicle class (ie, basic pavement, traffic signals, etc) are called "common" costs or "residual" costs and are assigned to all users of the highway in an equitable manner (ie, on the basis of vehicle miles of travel or a weighted factor thereof). For example, all vehicles share equally in the cost of the basic pavement and extra pavement thickness required by heavier vehicles is assigned to them on the basis of ESAL's. Similarly, increased grading, land and shoulder width costs are assigned to the heavier and larger vehicles responsible for them. For distribution of pavement repair costs, the new federal study (May 1982) has relied on a distress approach, similar to methods used in many state studies and by foreign countries.

The new federal study and many state cost allocation studies have focused on the question of equity and cross-subsidies of one vehicle class to another. Efficiency, on the otherhand, is compromised. Efficient pricing would involve including costs that motorists do not perceive, but which they impose on one another and the community (short run marginal costs). As the federal study states,

> Assuming that motorists make travel decisions rationally, a price for travel equal to the cost of the trip would accomplish the desired result...To achieve efficiency, road user charges should be set to cover these additional costs of travel that motorists would not correctly perceive in the absence of a government-imposed charge for use of the road.[4]

However, the federal study and that of most states have included only fixed capital costs which are clearly reflected in highway budget expenditures. Ideally, we believe that a highway cost allocation study should include all costs incurred. However, given the more limited focus of the federal study based on its Congressional mandate, we believe the new federal study has done a thorough analysis and greatly improved the method of assigning costs over previous federal studies.

There are basically two categories of highway costs: new construction costs and costs for repair of the existing system. Repair costs are more use-related and therefore a greater percent of the costs can be attributed to individual vehicle classes than in new construction, where a greater percent of the costs are "common" costs. Under the recommended approach in the new federal study, fully 95 percent of the pavement repair csots are attributed to individual vehicle classes (only 5 percent are common costs), whereas in new construction categories there are more common costs: 36 percent of the new pavement costs and 47 percent of the structural costs are common.

This is an important point becasue it sheds light on the inadequacies of past federal cost allocation studies which have assigned responsibility for new pavement and pavement repair costs in the same proportion. Moreover, past federal studies have tended to be heavily weighted toward common costs. These practices result in an underassignment of costs to the heaviest vehicles and an overassignment to passenger vehicles. The new federal study properly assigns new pavement and pavement repair costs according to different criteria.

The new federal study found that trucks as a class are responsible for 70 percent of the pavement repair costs and passenger vehicles for only 30%. While combination trucks constitute only 1 percent of the vehicle fleet in 1985, they are responsible for 58 percent of the pavement repair costs and 47 percent of the new pavement costs (see Table 1).

TABLE 1
COSTS BY CONSTRUCTION CATEGORY: DOT RECOMMENDED APPROACH
1985, Percentage of Costs Assigned to Each Vehicle Class

	New Pavement	Pavement Rehab	Structures	Grading	Misc.
PASSENGER VEHICLES	47.4%	30.3%	65.0%	78.4%	90.8%
Autos	33.5	15.4	46.0	55.5	65.7
Motorcycles	.4	.1	.5	.7	1.0
Pick-ups/vans	12.4	12.5	17.3	21.9	23.6
Buses	1.1	2.3	1.2	.4	.4
TRUCKS	52.6%	69.7%	35.0%	21.6%	9.2%
Single-unit Trucks	5.9	11.9	7.7	5.2	3.6
Combinations	46.7	57.8	27.3	16.3	5.6
TOTAL	100%	100%	100%	100%	100%

Source: Reference 5

As highway program funding priorities shift from new construction toward repair and reconstruction work, the cost responsibility of trucks, and the heaviest trucks in particular, will increase. The trucking industry has expressed concern that charging for both budget items constitutes "double-counting" wherein the industry is paying twice for the same item. The misconception here is the belief that road use is a free good once the construction costs have been paid. This, however, is not true. Construction and repair are separate budget items which interact but do not cancel one another.

III. TAX PAYMENT COMPARED WITH COST RESPONSIBILITY: UNDERPAYMENT BY HEAVY TRUCKS

Section 209(b)(2) of the Highway Revenue Act of 1956, which established the Highway Trust Fund states clearly:

> ...if it hereafter appears...that the distribution of tax burden among various classes of persons using the federal-aid highways, or otherwise deriving benefits from such highways, is not equitable, Congress shall enact legislation in order to bring about...such equitable distribution.

The recently completed federal cost allocation study and those of many states have found that automobiles and light trucks are overpaying in taxes and that trucks as a class, and heavy trucks in particular, are underpaying in taxes compared to their cost responsibility. This represents a subsidy to the heavy trucks by other users of the highway and should be corrected.

The new federal study indicates that in the base year period of the study (1977) passenger vehicles were paying more than their cost responsibility (autos were paying 111% and pick-ups and vans, 123%). Trucks as a class were paying 80 percent of their responsibility but there were significant cross-subsidies of light trucks to heavy trucks: single-units trucks were paying 150% of their responsibility while combination trucks were only paying 60% of their responsibility (the heaviest combinations were only paying 45%). In 1985, the study finds, if the present tax structure continues, passenger vehicles will be paying almost their full cost responsibility (98 percent) while combination trucks will only be paying 80 percent of their responsibility and the heaviest combination trucks (over 75,000 lbs), those that do the most damage to the pavement, will only be paying 60 percent of their responsibility (see Table 2).

TABLE 2
RATIO OF USER CHARGES PAID COMPARED TO COST RESPONSIBILITY*
1977 and 1985 COMPARED

	1977	1985
PASSENGER VEHICLES	1.11	.98
Autos	1.10	.97
Motorcycles	.46	.58
Pickups/vans	1.23	1.08
Buses	.51	.03
TRUCKS	.79	1.03
Single-units	1.51	1.99
Combinations	.59	.80
over 75,000 lbs	.45	.59

* Ratio of less than 1.0 indicates underpayment

Source: Reference 6

The findings of underpayment by heavy trucks and cross-subsidization to them by other classes of vehicles have also been found in state studies. The 1978 Georgia Highway Cost Allocation Study, for example, found 4- and 5-axle trucks paid only 50 percent of their cost responsibility. Oregon, Florida and other states have found similarly (see Appendix B).

IV. NEED FOR CHANGE IN THE EXISTING TAX STRUCTURE

The existing tax structure has remained basically unchanged since 1961. It fails to accurately assess vehicle classes for their true cost responsibility, as revealed in Table 2. Changes are needed to the existing highway user charge system if equity among users is to be obtained.

The new federal study recommends several changes that would greatly improve equity and then presents five tax options that would achieve this end (in total six options are presented, but Alternative 1 is continuation of the present system which leads to significant inequities). Fuel taxes continue to be a major revenue measure in all alternatives. Fuel taxes correlate somewhat with vehicle cost responsibility and tax a resource whose consumption should be discouraged. Fuel taxes alone are not adequate measures of cost responsibility because fuel consumption rises slowly in relation to weight while damage rises exponentially with weight. The DOT study recommends a higher tax for diesel fuel than gasoline to account for the fuel economy difference between gasoline and diesel engines. Nine states currently tax diesel higher than gasoline. We would not object to this difference in taxing and support the DOT recommendation for an increase in the gasoline tax as part of the total user fee increase.

The present user charge which best matches cost responsibility is the heavy vehicle use tax which is applied to all vehicles over 26,000 lbs (at a rate of $3 per 1,000 lbs). DOT recommends that this tax continue but be steeply graduated by vehicle weight and that the threshold of the tax be moved to a higher gross vehicle weight. DOT further recommends that the tax be paid directly on gross vehicle weight rather than the present method which calculates gross weight from empty weight. Several other revisions are recommended as well. DOT points out that this tax is vital because,

> (this) Tax is one of the only administratively feasible means available to the federal government for collecting from heavy vehicles close to the share of highway costs they owe.[7]

Research we have conducted leads us to believe that the best tax for matching cost responsibility and tax payment is a weight distance tax on heavy vehicles. A weight distance tax is based on the registered gross weight of a truck and the mileage it travels. The tax schedule is graduated with increase in weight. Thus, the heavier the vehicle and the more it travels, the more taxes paid. This is preferable to the heavy vehicle tax recommended by DOT because it eliminates any within class inequity wherein all trucks of a particular weight are taxed alike, regardless of their mileage. Oregon has had a weight distance tax in effect since 1947 and found it no more difficult to administer than other vehicle taxes and that only 3 percent of the revenues raised go to administration. Many other states already participate in a multi-state vehicle registration plan known as the International Registration Plan (IRP) under which miles travelled by trucks in each state are kept in order than truck registration fees be fairly shared. With over half the states already participating in such a plan, IRP could serve as the basis for a national weight distance tax. DOT has stated that such a tax is not feasible at the federal level at the present time due to budget constraints and administrative problems it presents. We urge DOT to continue to examine such a tax. In the meantime, however, the DOT recommendation of a steeply graduated tax based on vehicle weight, appears to be the best substitute.

DOT also recommends the elimination of exemptions that are presently granted to many vehicles. In 1977, exemptions for state and local government owned vehicles and school buses accounted for nearly all exemptions. The revenues foregone accounted for 6 percent of the total user charge revenues collected in 1977. In 1985, over half of the revenues foregone are again due to exemptions for state and local government vehicles. The rest are due to gasohol exemption and exemptions for buses. In 1985, revenues foregone due to exemptions will amount to 10 percent of the total user charge revenues. The exemption for gasohol results in significant revenues losses: estimates of revenue loss range from $71 million to $150 million in 1985 (due to varying assumptions). Because we believe that gasohol represents an economically inefficient way in which to produce fuel and uses agricultural production for fuel rather than food, we support the elimination of this exemption. We do not, however, support DOT's recommendation to eliminate many other exemptions at the present time, particularly the elimination of exemptions for school and transit buses which serve vital social and energy goals, and the elimination of exemptions for state and local governments which provide valuable public services and are facing severe financial burdens at the present time.

We strongly support the need for changes in the tax structure to bring about equity. We are not prepared to endorse the precise tax alternatives presented by DOT in its study because of some of the differences we have as discussed above.

V. IMPACTS OF CHANGES IN THE TAX STRUCTURE

Changes in the present tax structure in order to bring about equity among users will not have significant negative impacts on any of the vehicle classes. On the whole, in fact, user charges as a percent of vehicle costs will fall in 1985 compared to 1977 (Table VI-21 in DOT study). Further, federal highway user charges constitute only a small portion of total vehicle operating costs: on average, they are 1 percent of vehicle operating costs (Table VI-24 of DOT study). Therefore, the increases presented in the federal study will have only a small impact on any of the vehicle classes. The study points out that the percentage increase in operating expenses under any of the alternatives (compared to a continuation of the existing structure) for combination trucks, which experience the largest increase, is less than 2 percent and for the heaviest combination trucks (over 75,000 lbs) no more than 3.4 percent.

While having little negative impact on any vehicle classes, there is a positive impact from the tax changes to the total transportation system. An efficient intercity freight transportation system is critical to a well functioning economy. In 1978, approximately 2.3 X 10^{12} ton miles of freight were transported by intercity shippers. Railroads and trucks often find themselves competing for frieght. Freight transport by rail is more energy efficient: rail uses only one fourth as much energy per ton mile as truck transport (625 Btu's per ton mile vs. 2,380 Btu's per ton mile).[8] Trucks as a class consume nearly half of the total energy used in freight transportation but they move only about one third of total freight. Rail, by contrast, moves about the same amount of freight but consumes only 17 percent of the total energy used in freight transportation.[9] To the extent that trucks are not paying their fair share in taxes and being subsidized by other highway users, there is an inefficiency introduced into the market and a competitive edge given to a less energy efficient mode of freight transportation. We believe that this distortion in the market should be corrected and that users of the highways should pay their full share of roadbed costs.

In conclusion, we agree with the Department of Transportation that changes in the present tax structure are needed to correct for present subsidies to heavy trucks by other classes of highway users and with DOT's statements that such tax changes will have little negative impact on highway users and will result in tax equity and improved efficiency in the total transportation system. We urge you to take action on this important issue and to restructure to highway user charge system.

Thank you for the opportunity to express these views. I would be happy to respond to any questions the Committee might have on points we have made.

FOOTNOTES:

1. General Accounting Office, Excessive Truck Weight: An Expensive Burden We Can No Longer Afford, July 1979.
2. *Ibid.*
3. Transportation Research Board, Consequences of Deferred Maintenance, May 1979.
4. Department of Transportation, Final Report on Federal Highway Cost Allocation Study, May 1982.
5. *Ibid.*
6. *Ibid.*
7. *Ibid.*
8. Oak Ridge National Labs, Transportation Energy Conservation Databook, Edition 5, Oak Ridge, TN, November 1981.
9. *Ibid.*

APPENDIX A

DEFICIENT PAVEMENT ON THE FEDERAL AID HIGHWAY SYSTEM AND COST TO MAINTAIN CURRENT CONDITIONS

TABLE 1

	RURAL PAVEMENT			URBAN PAVEMENT		
	POOR	FAIR	GOOD	POOR	FAIR	GOOD
INTERSTATE						
1975	4%	22%	74%	3%	29%	68%
1978	9%	28%	63%	8%	34%	58%
ARTERIALS						
1975	7%	46%	47%	6%	46%	48%
1978	6%	52%	42%	6%	53%	41%
COLLECTORS						
1975	10%	60%	30%	9%	55%	36%
1978	9%	66%	25%	8%	59%	34%

TABLE 2

FEDERAL-AID CAPITAL INVESTMENTS: 15 YEAR NEEDS
TO MAINTAIN CURRENT CONDITIONS (1980 dollars, billions)

	Current Federal Share	Total Federal Cost		Average Fed. Cost	
		High Travel	Low Travel	High Travel	Low Trav
Primary	.48	$30.2	$23.8	$2.0	$1.6
Interstate[1]	.90	$24.7	$21.8	$1.6	$1.4
Secondary	.30	$17.8	$16.7	$1.2	$1.1
Urban[2]	.40	$16.1	$15.8	$1.1	$1.1

1. Includes $4.5 billion for bridge deck repair. Does not include cost to complete
2. These levels will not maintain 1978 levels. They represent an upper dollar level that existing FAUS mileage could absorb.

APPENDIX B

STATE HIGHWAY COST ALLOCATION STUDIES

I. Georgia (March 1979)

The state of Georgia's Dept. of Transportation conducted a cost allocation study in March 1979 to determine: 1) annual user cost responsibility of each vehicle class; and 2) how that compares to the road user taxes contributed by each vehicle type. The study found:

1. Cars and pick-up trucks are overpaying in taxes compared to cost responsibility (paying 103% and 136% respectively)

2. Trucks are significantly underpaying in taxes, with the greatest underpayment by the heaviest trucks. 3-axle trucks are paying 89% of their responsibility; 4-axle trucks 53% and 5-axle trucks only 44% of their responsibility.

TABLE 1

GEORGIA: ANNUAL COST RESPONSIBILITY AND TAXES COMPARED

	Annual Cost Respon.	Income Contrib.	% Respon. Covered	
1. Cars	$198.4 million	$204.7 million	103.0%	
2. Pickups/ panels, 2-axle	52.6	71.5	136.0%	
3. 2-, 3-axle single units	34.6	22.7	65.8%	
4. Tractor semi-trailer				
1. 3-axle	1.8	1.6	89.1%	51.2%
2. 4-axle	19.1	10.2	53.4%	
3. 5-axle	85.8	37.8	44.0%	
5. Buses	4.5	3.7	81.9%	

Trucks as a class were underpaying by $69 million in 1978 while autos and light trucks were overpaying by $6 million and $19 million, respectively. The heaviest trucks, 5-axles, were underpaying by $48 million. Georgia is in the process of up-dating its study.

II. FLORIDA (Sept. 1979)

The state of Florida conducted a cost allocation study in September 1979 and found:

1. Cars are overpaying their share of highway costs (paying 104% of their responsibility)

2. Trucks are substantially underpaying in taxes compared to cost responsibility. As a class, they are only paying 64% of cost responsibility, with the heaviest trucks underpaying by the largest amount (4-axle and 5-axle trucks are only paying 56% and 50% of their responsibility).

TABLE 2

FLORIDA: COST RESPONSIBILITY BY VEHICLE CLASS, 1979

	Cost Responsibility Covered		Distrib. of Truck VMT
1. Autos	104.2%		
2. 2-and 3-axle single trucks	91.1%		52.9%
3. Tractor semi-trailer			
1. 3-axle	214.9%	64.5%	1.1%
2. 4-axle	56.3%		23.1%
3. 5-axle	50.5%		22.3%

V. COLORADO (October 1981, Draft Final Report)

In October 1981, the Colorado Dept. of Highways completed a draft final report on Highway Cost Allocation. The study examines user contributions to the state Highway User Trust Fund (HUTF) for FY 1981 and cost responsibility for calendar year 1979. Despite the fact that Colorado already has a ton-mile tax in effect (revenues from this tax totaled $24.9 million in 1981) the revised final report (revised from draft based on public input), found that heavy vehicles are still underpaying. Heavy vehicles contributed 23% in revenues to HUTF while being responsible for 32% of expenditures. The draft final report concludes that "contributions by heavy vehicles should be adjusted to equitable levels based on cost responsibility".

TABLE 3
COLORADO: VEHICLE CONTRIBUTIONS TO HUTF AND COST RESPONSIBILITY COMPARED

Vehicle Class	% Contrib. to HUTF	Cost Responsibility
1. Basic Vehicles (<10,000 lb)	77.0%	67.8%
2. 10,001-40,000 lbs	9.0	7.8
3. 40,001-50,000	.8	1.3
4. 50,001-60,000	.8	2.0
5. 60,001-70,000	.5	.1
6. 70,001-80,000	11.6	18.6
7. Over 80,000	.3	1.7

Table 3 shows that basic vehicles and light trucks (under 40,000) are overpaying in taxes compared to cost responsibility, while heavy trucks are underpaying. Trucks above 60,000 lbs are contributing only 12.4% to HUTF while responsible for 20.4% of expenditures incurred.

VI. MISSISSIPPI (October 1980)

The Mississippi State Highway Dpet. completed a cost allocation study in October 1980, entitled Cost Allocation Based on Vehicle Size: 1978, 1979 and 1980. The study applied the incremental method as used in California to its own highway situation. The study found that in 1978, 1979 and 1980 trucks were underpaying in taxes compared to their cost responsibility.

TABLE 4
MISSISSIPPI: HEAVY VEHICLE COST RESPONSIBILITY AND TAX PAYMENT COMPARED

Fiscal Year	Cost Responsibility		Tax Payment	
	$ Millions	% of total	$ Millions	% of total
1977-1978	$ 58.9	39%	$ 16.6	22%
1978-1979	72.9	39%	25.6	21%
1979-1980	116.6	40%	118.0	23%

III. OREGON (Updated Study, 1980)

A 1947 study of highway cost allocation led to passage of the state's first "graduated weight-mile tax" which became effective in 1947. A weight mile tax is based on registered gross weight of the vehicle and the miles travelled. It has been adjusted several times.

The 1980 Motor Vehicle Cost Responsibility Study is the most recent update in Oregon. The study found that heavy vehicle cost responsibility had increased since the last study (1974) from 35.4% to 44.5% of highway expenditures (basic vehicles are responsible for 55.4%). This increase is due to the shift in traffic toward heavier trucks and the change in highway expenditures toward maintenance which is more weight-related.

Oregon's experience with a weight-mileage tax indicates:

1. INSIGNIFICANT IMPACT ON TRUCK OPERATING COSTS: In 1979, the weight-mileage taxes were only 2.7% of total truck operating costs and in 1980 expected to be less as other operating costs, such as fuel and labor, rise.
2. ADMINISTRATIVE COSTS AND EASE: In 1980, Oregon weight-mileage tax raised $58 million in revenues, of which only 3% ($1.5 million) went for administrative costs. It has been Oregon's experience that there is no more administrative difficulty in administering such a tax than in administering other vehicle taxes and it is preferred over other taxes for heavy vehicles because of the equity implications. Truck firms are already required to keep mileage records for purposes of depreciation, prorating of registration fees, and for other states. Thus, the weight-mileage tax does not impose additional record-keeping.
3. RATE SCHEDULE: The graduated weight-mileage tax ranges from .6¢/mile on the lightest trucks (0-6,000 lbs) up to 6.5¢/mile for the heaviest trucks (78,000-80,000 lbs).

IV. CALIFORNIA (1976 study and 1981 update)

In 1976, following an increase in the axle weights in California (from 18,000 to 20,000 single axle; from 32,000 to 34,000 lbs tandem), the Dept. of Transportation conducted a study entitled, Heavy Vehicle Cost to State Highways in California. The study found that 99% of the damage to structural pavement is caused by vehicles weighing 6,000 lbs. and over. The study further found that fully 25% of maintenance costs were attributable to heavy vehicles.It concluded that a modification to the present weight fee structure for heavy vehicles was warranted.

In October 1981, the California state legislature enacted SB 215 which provided for an increase in weight fees for commercial vehicles. The increase was approximately 50%, effective January 1, 1982 and an additional 10%, effective January 1985. The question of inter-truck class equity still remains to be improved as light trucks are disproportionately affected by the bill (as 86% of truck registrations are 6,000 lbs. or less, yet they do much less damage than the heavy vehicles). In November 1981, legislation was proposed (AB 1716/SB 805) to impose a heavy vehicle weight distance tax (ton-mile tax) in addition to other fees already in effect. This tax would range from 2¢/mile for vehicles 50,000-55,000 lbs. to 6¢/mile for trucks with gross weight of 78,000 lbs and above. The legislation was referred for further study. Concurrent with consideration of this bill, the Dept. of Transportation updated the 1976 study and found that 28% of state highway costs are attributable to trucks only ($1.2 billion from 1982/83-1986/87).

VII. ARIZONA

In July 1981, the Arizona state legislature enacted SB 1001, which establishes a ton-mile tax on heavy vehicles. The tax will take effect July 1, 1982 on vehicles with gross vehicle weight above 12,000 lbs; vehicles of 12,000-26,000 gross vehicle weight will pay a fixed annual fee and those above 26,000 lbs. will pay a fee based on their gross weight and mileage travelled in the state. The graduated fee ranges from 1.3¢/mile up to 8¢/mile for the heaviest vehicles. The ton-mile tax is estimated to generate $279 million over the 5 year period 1982-86 for the state highway system. Arizona already has a ton-mile tax in effect. The new tax will increase the fees paid by trucks.

VIII. VIRGINIA (November 1981)

The 1980 Virginia General Assembly enacted SJR 50 which mandated a full scale cost responsibility study. The Joint Legislative Audit and Review Commission undertook the study and presented their findings in a November 1981 report to the Assembly.

Virginia already has an additional (beyond the normal gas tax) tax of 2¢/gallon on most trucks with 2- or more axles, on fuel used in Virginia. It is not surprising therefore that the study found that generally the tax structure is equitable. Yet, even with the existing truck tax, the study still found overpayment by autos and pickup trucks and underpayment by heavier trucks. Unlike findings in other states, Virginia found the greatest underpayment by the medium trucks. This is due to the fact that these vehicles are not subject to the present truck tax. Autos and pickup trucks were found to be overpaying by $18.9 million or 4.2% while all truck classes were found to be underpaying.

TABLE 5
VIRGINIA: COST ALLOCATION AND REVENUE ATTRIBUTION ($ millions)

	Cost Allocation (Responsibility)	Revenue Attrib. (tax payment)	$ Under- or overpaid	% Under- or overpai
Class I	70.9%	74.0%	Overpaid $18.9	Overpaid 4.2%
Class II	8.5%	6.1%	Underpaid $14.1	Underpai 38.1%
Class III	4.5%	3.9%	Underpaid $ 4.0	Underpai 16.9%
Class IV	16.1%	16.0%	$ .8	.8%

Class I= passenger cars, pickup and panel trucks, motorcycles
Class II=2-axle, 6 tire trucks and buses
Class III=3-axle single unit trucks and buses
Class IV= 3-, 4- and 5-axle tractor trailers (combinations)

A legislative package is now pending in the Virginia legislature that would increase registration fees on vehicles and improve the equity of the tax structure.

IX. ARKANSAS

The Arkansas cost allocation study is based on the methodology used in other states and applied to the Arkansas highway system. Arkansas found that trucks are underpaying in taxes: they are responsible for 37% of the highway expenditures and paying only 25% of the taxes. A ton-mile tax was introduced in the last legislative session but was not approved.

X. NEW MEXICO (1972)

The New Mexico Cost Allocation study, conducted in 1972, examined cost responsibility for vehicles under three different allocation methods: 1) the incremental method; 2) cost function method; and 3) gross ton-mile method. The study looked at 20 year revenue and expenditure projections and then computed an average annual revenue and expenditure estimate. Other studies have generally relied on actual revenues and expenditures from recent years. Further, unlike other studies, the New Mexico study assigned 34% of highway responsibility to non-users; thus, only 66% of highway expenditures were assigned to users. The study found large variation in cost responsibility among the different methods employed. Due to this variation, it is difficult to draw any conclusions other than to state that under all methods, all classes of vehicles are found to be underpaying. Autos and pickup trucks are covering approximately 65-68% of their cost responsibility, while heavy truck coverage ranges from only 22% of their responsibility (under ton-mile method) to 61% of their responsibility (under incremental and cost function methods). The New Mexico study recommended that gross vehicle weight be established as the basis for truck registration. The 1981 state legislative session introduced a bill to provide funds for an updated cost allocation study, but the bill died in committee.

XI. STATES WITH STUDIES IN PROGRESS

1. MAINE: presently conducting in-depth cost allocation study which will be complete in the next 2-3 months.
2. MICHIGAN: in the process of conducting state study which will be complete in the next 6 months.
3. WISCONSIN: conducting in-depth study which should be available in June
4. OHIO: cost allocation study mandated by legislature last August and required to be complete by July 1982.
5. TEXAS: study in progress
6. MINNESOTA: looking to the outcomes of the federal and Wisconsin studies before updating its past study.

ENVIRONMENTAL POLICY CENTER
317 Pennsylvania Ave., S.E., Washington, D.C. 20003
202/547-5330

November 4, 1982

Senator Steven Symms
Chairman, Transportation Subcommittee
Environment & Public Works Committee
4204 Dirksen Office Building
Washington D.C. 20510

Dear Senator Symms:

Enclosed are the responses of the Environmental Policy Center, to the eighteen questions provided by the Committee, as follow-up to our testimony on August 10, 1982 on the issue of cost allocation and highway damage.

We again thank the Committee for the opportunity to express our concerns on this important issue.

Sincerely,

Harriet Holtzman-Parcells

Harriet Holtzman-Parcells
Washington Representative

FOLLOW-UP QUESTIONS FOR THE ENVIRONMENTAL POLICY CENTER

1. The 1962 American Association of State Highway Officials Road test found that a fully loaded tractor-trailer/semi combination does the saem amount of pavement damage as it takes 9,600 cars to cause. The recent U.S. Department of Transportation cost allocation study uses a ratio of approximately 1 to 18. Do you believe this is a conservative estimate?

2. Do you believe the AASHTO "Interim Guide for the Design of Pavement Structures" needs to be updated? Are the pavement thickness guidelines adequate for current traffic volumes and weights?

3. The American Trucking Associations recently commissioned two studies of pavement deterioration. Both these studies assert that environment, not use, is the major cause of pavement deterioration. AASHTO reviewed the studies and found that: (1) they appear to ignore the many studies that did show a strong correlation between axle applications and pavement deterioration; and (2) they fail to point out that loads and environmental factors interact, one reinforcing the other, to cause pavement damage. Do these two points indicate that some damage-related approach, rather than the incremental approach, is required to allocate pavement rehabilitation costs?

4. ATA stated in its testimony, "A growing body of evidence reveals that ESALs are very poor predictors of pavement performance (or damage) and particularly so for adequately designed pavements." Would you agree or disagree with this?

5. Both the DOT's recommended cost allocation approach as well as the incremental method favored by the ATA show that the lighter trucks have been subsidizing heavy combination trucsk. Do you believe there should be a redistribution of tax responsibility among truck classes or shoudl this subsidization continue?

6. According to a complaint of the truckers, the wear based method used in the DOT study attributes all damage to vehicles even though roads would require replacement due to weather, climate and age. Why should a truck pay any more than a car does for costs attributable to these factors?

7. How valid do you believe the DOT cost allocation study's assumptions, methodology, and findings to be?

8. The Oregon DOT has stated, "(w)e have also observed taht longitudinal cracking in pavements can either be environmentally or load caused... However, without heavy wheel loads, these cracks require little or no maintenance in Oregon's climate." What are your research findings on this subject?

9. Both Arkansas and Louisiana DOTs have asked truckers to use the left lanes on certain Interstate highways. Why do you believe this action was taken?

10. According to an AASHTO report, Caltrans has compared two freeways during a 35 year time span, with both freeways having similar pavement thicknesses. One had basic travel only while the other carried mixed traffic including many heavy vehicles. The mixed traffic freeway required many repairs while the other freeway required little or no maintenance. To what would you attribute the difference in performance of these pavements?

11. There has been frequent reference to the Baltimore-Washington Parkway as an example of a highway that is deteriorating despite the absence of truck traffic. The B-W Parkway is 22 years old. Do you believe it has lasted its intended service life or that environmental factors are mostly to blame for the deterioration?

12. At what point does road damage and deterioration become so severe as to constitute a major, national problem? How large-scale are the highway infrastructure needs at present?

13. DOT has said that the issues of cost allocation, truck size and weight, and user charges should be taken up in a comprehensive legislative package. Do you see the issues interrelating?

14. Although several States have implemented weight-distance taxes, there are said to be significant administrative and enforcement problems if such a tax were to be imposed at the Federal level. How do you believe those problems might be resolved?

15. The Treasury Department testified last month about the enforcement problems which a differential gasoline and diesel fuel tax would pose if implemented at the Federal level. What do you see as the advantages of such a tax structure and how major do you believe the enforcement problems would be?

16. You testified in favor of maintaining the current exemption for vehicles-owned by State and local governments. That exemption is by far the largest, it imposes a significant revenue loss to the Trust Fund, and is not warranted from a cost allocation equity perspective. Why do you favor this subsidy in this form?

17. What effect would increasing only the Federal gas tax have on the equitable distribution of costs among the user classes?

18. It has been said that toll roads could better match rates to actual road costs. What is your position on toll financing of highways?

ENVIRONMENTAL POLICY CENTER
317 Pennsylvania Ave., S.E., Washington, D.C. 20003
202/547-5330

November 3, 1982

Response to Follow-Up Questions to EPC Testimony Before The
Senate Environment and Public Works Committee
on August 10, 1982

1. We believe that the recent U.S. DOT Final Report on Highway Cost Allocation is conservative in its estimates and allocation of costs. The study represents a significant improvement over past federal studies, particularly in its allocation of repair costs, an increasingly important concern and budget item. However, the federal recommended approach allocates far less damage responsibility to heavy trucks than would a method using the AASHTO Road Test equations directly for all pavement rehabilitation costs. The Road Test approach, which assumes that all rehabilitation costs are directly related to ESAL's, would assign 88 percent of all pavement costs to trucks (of which 73 percent would be assigned to combinations). This compares with recommended approach which assigns only 68 percent of pavement costs to trucks (of which 56 percent are assigned to combinations). Table IV-18 in the federal study presents this information. As the assignment of pavement costs has a major effect on the overall cost assignments and outcome (pavement expenditures being the largest component of federal expenditures), use of the recommended approach indicates a conservative approach taken by DOT.

2. The Interim Guide for Design of Pavement Structures is based on empirical relationships derived from the AASHTO Road Test, supplemented by theory and data developed from current practices of highway construction agencies. A survey of the 50 states regarding use of the Interim Guide was undertaken by AASHTO and revealed it to be of great value to highway departments across the country. However, we believe that the word "interim" in the title, indicates that refinements would be made in future years based on further research findings. Page 3 of the Guide states:

> It is expected that it will be subject to periodic review and revision as may be found necessary through practice and further research.

We believe that AASHTO would be in the best position to respond more specifically as to what refinements might be needed, if any.

3. We disagree with the American Trucking Association's studies which assert that environment, not use, is the major cause of pavement deterioration. We strongly agree with AASHTO's findings that: 1) studies show a strong correlation between axle applications and pavement deterioration, and 2) loads and environmental factors interact. The AASHTO Road Test indicates that the damaging effect of vehicles on pavements is approximately proportional to the 4th power of axle load. In regard to the second point,

AASHTO Road Test equations predict that no deterioration whatsoever would occur in the absence of traffic. According to the test, loss of pavement serviceability is totally related to traffic. Major research efforts underway in recent years are attempting to refine our understanding of pavement deterioration under the influence of traffic. Distress models are used, which consider the effect of the most important distresses for flexible and rigid pavement and model their occurrence as a function of traffic. Traffic remains a factor in the major distresses. We believe that research indicates that a damage-related approach is required to allocate pavement rehabilitation costs. In fact, the assignment of pavement costs by a damage or consumption approach is comparable to methods used in many state studies and those conducted in foreign countries.

4. We strongly disagree with ATA's statements that ESAL's are very poor predictors of pavement performance (or damage). The body of research we have reviewed indicates that pavement damage is intricately related to ESAL's. This is reflected in state studies we have reviewed and studies used abroad.

5. State and federal studies all indicate cross-subsidization of heavy combination trucks by light trucks and other highway users. We believe that cross-subsidies to heavy trucks (both within vehicle class and between vehicle class subsidies) should be eliminated.

6. The wear and tear method used by DOT does not, as we understand it, attribute all damage to vehicles; assignment is included for other factors, such as environmental factors. As to the second part of the question, trucks should pay more than autos for road repair because road damage is weight-related. Damage increases exponentially to the 4th power with increases in vehicle weight.

7. The new federal cost allocation study represents in our opinion a major improvement over past federal studies, particularly in its assignment of pavement repair costs. However, stated study constraints result in compromise from the ideal in certain areas. As stated on page III-2 of the study,

> This studv and all previous Federal and state cost allocation studies have only partially adhered to the equity criteria.

Study mandates, data limitations and administrative expense of certain highway user charge mechanisms are cited as reasons for compromising equity. Economic efficiency is also compromised because the study is set up to generate a fixed amount of revenues. Trully efficient user charges would generate much larger revenues. As the study states in this regard,

> If both pavement damage and the other components of SRMC (short run marginal costs) were priced correctly...efficient pricing would result in new annual economic benefits of $10 billion and annual user charge revenues of $80 billion... the $80 billion would be much more than needed to finance present highway programs or substitute for present user charges.

We are not entirely convinced that the data limitations or administrative infeasibility attributed to some user charge mechanisms are as great as presented by DOT. For example, we are not convinced that a weight distance tax, the most equitable type of tax for heavy vehicles, is unfeasible. Also, we wonder whether the budget used by DOT adequately reflects "true costs", ie, deferred maintenance costs. For example, the 1980 Oregon state study states:

> Efficiency means that road user taxes should recover the "true" costs rather than only budgeted expenditures. Expenditures are generally based on monies collected and do not reflect "true" costs of the road system, ie, the actual deterioration of the system. Expenditure based budgets exclude the costs of postponed construction and deferred maintenance.

Finally, the federal study, by convention, only accounts for federally-financed government borne costs. Other governments are expected to assign other government borne costs not reimbursed by the federal government.To the extent that these levels of government fail to adequately assess vehicles for this share of costs, we are only obtaining partial equity. However, as we stated at the outset of this response, we find this federal study a great improvement over past federal studies. The findings of the study are consistent with those of many states. The finding of cross-subsidization of heavy trucks by light trucks and other users of the highways has been found in study after state study (see Appendix B of EPC testimony). The finding that heavy truck user fees need to significantly increase to bring equity to the user fee structure is a finding with which we agree and consistent with other studies we have reviewed. We do not agree with the finding that a weight distance tax, the most equitable tax, would not work at the federal level.

8, The Oregon DOT findings that without heavy wheel loads, pavement cracks require little or no maintenance, is consistent with research we have reviewed.

9. A quote from Henry Gray, Arkansas Highway Director, quoted in the Wall Street Journal (May 11, 1982) best answers why Arkansas and Louisianna have asked truckers to use the left lane of certain highways:

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Nov. 3, 1982

> The right lane is wearing out faster because all the heavy trucks use it. We're trying to equalize pavement wear and thus extend the life of our roads.

Arkansas claims that its rural highways are among the worst in the country.

10. We would attribute the difference in performance of these pavements to the differences in traffic travelling on them. The weight and repeated application of truck axles in mixed traffic would cause the highway with mixed traffic to deteriorate more rapidly than the highway with basic traffic only. The California Transportation Lab estimated that approximately 99 percent of damage done to structural pavement is caused by vehicles weighing over 6,000 lbs gross.

11. The fact that the Baltimore-Washington Parkway is wearing out after 22 years should not be surprising, as roads are designed to last for 20 years. What is being experienced on many other highways, by contrast, is accelerated deterioration due to increased numbers and weights of vehicles beyond those used in design life projections. These highways are wearing out before their expected design life.

12. Road damage and deterioration has become severe enough to constitute a national problem. Nearly 26,000 miles of Interstate, arterial and collector highways are in immediate need of major repair or reconstruction. On the federal-aid system alone, over 105,000 bridges would be closed to traffic if alternate crossings were available. The Road Information Program (TRIP) estimates that the aggregate cost to the private sector of bad roads and bridges is on the order of $30 billion per year. Beyond this cost, is the cost in human lives.A recent Federal Highway Administration study found that spending an extra $4.3 billion to fix dilapidated bridges and roads would save 480,000 injuries and 17,000 lives over 15 years. It is estimated that the Interstate System alone will need $33 billion (1982 dollars) in repair funding in the decade ahead and another $47 billion is needed to repair our bridges. We believe that a major reorientation in federal funding is needed, away from new construction and toward maintenance of the existing infrastructure.

13. Issues of cost allocation, truck size and weight and user charges are intricately interrelated and should be discussed in conjunction by Congress. Research has demonstrated that: 1) road damage increases exponentially with increases in vehicle weight and, 2) that heavy trucks are significantly underpaying in taxes compared to their cost responsibility. Increases in truck size and weight will further increase their damage responsibility and exacerbate the inequities that already exist in the highway user fee system. Therefore, we believe that increases in truck size (which we oppose) should not be discussed or permitted without discussion of increases in truck user fees.

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Nov. 3, 1982

14. We remain unconvinced that the administrative problems of implementing a weight distance tax are so great as to preclude its consideration at the federal level. Many states already participate in a multi-state vehicle registration plan known as IRP (International Registration Plan), under which records are kept of mileage travelled by trucks in each state. This allows for fair sharing among states of truck registration fees. Over half the states, we understand, already participate in such a plan. IRP could serve as the basis for a federal weight-distance tax. We strongly support further examination of this option by the federal government as it represents the best tax option for matching cost responsibility and tax payment by heavy vehicles.

15. While gasoline engines have dominated the automobile market in the past, diesels are becoming more popular, due to the increased cost of gasoline. Diesel engines are today's most efficient engine for transportation. Diesels have long dominated the heavy duty truck market because of the high mileage accumulated by such vehicles and the desire by owners to keep down operating costs. Because of the greater fuel efficiency of the diesel engine, DOT points out in its report that a differential tax at the pump (higher for diesel fuel) could be justified. Moreover, a higher tax on diesel could be used as part of the overall change needed to bring about equity in the highway user fee structure. Nine states now tax diesel fuel at a higher rate than gasoline. We are unclear as to why enforcement would be more difficult at the federal level than at the state level, as the U.S. Treasury Department testified.

16. We believe, and research indicates, that it is the heavy combination trucks which are responsible for most highway deterioration, not the light duty vehicles owned by state and local governments. Given the vital public benefits provided by state and local governments, and the social and energy goals served by school and transit buses, we do not support eliminating the exemptions for such vehicles, particularly at the present time when they face such financial difficulties.

17. Increasing only the federal gasoline tax would not adequately address the need to bring equity to the present tax structure. While fuel taxes correlate somewhat with vehicle cost responsibility, and tax a resource whose consumption should be discouraged, fuel taxes alone are not adequate measures of cost responsibility. Fuel consumption rises slowly in relation to vehicle weight while road damage rises exponentially.

18. Toll roads are a direct method of charging users for benefits received. We have not adequately researched this issue to determine if they could (or would) match rates to actual road costs.

FEDERAL HIGHWAY PROGRAM NEEDS

WEDNESDAY, AUGUST 18, 1982

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON TRANSPORTATION,
Washington, D.C.

The subcommittee met at 10:12 a.m., in room 4200, Dirksen Senate Office Building, Hon. Steve Symms (chairman of the subcommittee) presiding.

Present: Senators Symms, Stafford, and Bentsen.

Senator SYMMS. Good morning. We will now continue the second day of our hearings on the highway program needs, revenues, and cost-allocation issues.

We are delighted to have this very distinguished witness list this morning. We will be happy to hear first from Alice Rivlin, the Director of the Congressional Budget Office. So please go right ahead, Dr. Rivlin.

STATEMENT OF HON. ALICE RIVLIN, DIRECTOR, CONGRESSIONAL BUDGET OFFICE, ACCOMPANIED BY DAMIAN KULASH AND RICHARD MUDGE

Ms. RIVLIN. Thank you very much, Mr. Chairman.

Mr. Chairman, I am pleased to appear here as you discuss the financing of the Nation's highway system. My remarks this morning will cover three topics:

The extent of the Nation's highway problems and the degree to which they are addressed by the bills currently being considered by the Senate and the House;

The outlook for the highway trust fund; and

Some of the implications of the Department of Transportation's recently completed highway cost allocation study.

THE NEED FOR HIGHWAY FUNDING

Keeping existing roads and bridges in repair is the Nation's major highway problem. A second problem is the completion of the Interstate Highway System. Since both require more resources than are currently available through the highway trust fund, the Congress faces a choice between two quite different long term solutions: A much larger Federal highway program financed by an increase in Federal highway taxes or a major shift in responsibility and tax burden to the States.

Most Federal highway aid is allocated to four sets of roads that comprise the Federal-aid system—the interstate, primary, secondary, and urban systems. These roads carry 80 percent of the Nation's highway traffic.

For fiscal year 1982, Federal highway authorizations total about $9 billion. Approximately $6 billion of this is for the interstate and primary systems—$3.2 billion for interstate construction, $800 million for interstate repair, with the balance for repairing the primary system and bridges on both systems. Of the remaining amount, $1.2 billion is allocated to repairing urban and secondary roads and $1.8 billion to a host of miscellaneous programs, including safety grants.

State and local governments fund most of the roads off the Federal-aid system and all of the routine maintenance—pothole filling and grass mowing, for example. As a result, States paid for about half of the total national expenditures of $34 billion for roads in 1980. The Federal Government accounted for a quarter of this total and cities and counties for the rest.

Roads and bridges obviously do not last forever. The typical new road is designed for 20 years of normal traffic while a 50-year life is expected for most bridges. Large parts of the Federal-aid system are reaching their normal life expectancy. By 1990, 75 percent of the Interstate System will be over 20 years old and most other parts of the Federal-aid system have already passed this mark. Also by 1990, 30 percent of the bridges on the Federal-aid system will be 50 years or older. Indeed, 10 percent of these bridges have already been identified as structurally deficient. Thus repair and rehabilitation work for both roads and bridges is becoming increasingly crucial.

Estimates of the amount of repair needed are necessarily imprecise. It appears, however, that Federal expenditures averaging $8.4 billion per year will be needed to repair poor roads on the interstate system and to prevent further deterioration of other parts of the Federal-aid system. These repair costs include: around $2.9 billion for interstate routes; perhaps $2.6 billion for primary routes; roughly $1.0 billion and $0.6 billion for secondary and urban roads, respectively; and about $1.3 billion for structurally deficient bridges on the entire Federal-aid system.

In addition to repairing existing interstate routes, substantial funding is required for two types of new construction: Building planned routes that are not yet open to traffic and reconstructing of routes that are currently in use. It is also important to distinguish between those unbuilt routes that form integral parts of an interconnected national road system and those that serve predominantly local traffic. This results in three groups of Federal costs for new construction on the interstate system:

About $2.2 billion per year is needed to complete unbuilt routes that are essential to an interconnected national network.

If unbuilt routes of predominantly local importance are also built, $2.9 billion more per year would be required, raising the total cost of interstate completion to $5.1 billion per year.

Around $1.1 to $1.9 billion per year is required for "reconstruction" projects, many of which represent relatively low-priority projects that have been eliminated from the planned National System. Nevertheless, many of these are locally important projects, such as widening of congested urban routes, and many States are relying on continued Federal support for them.

In short, current authorizations of $3.2 billion per year fall far short of paying for these three sets of costs, which together come to more than $6 billion annually. This total cost could be reduced by eliminating some of the aid to reconstruction or to unbuilt routes of local importance. Even so, major changes would be needed to bring the total cost of new construction within current authorizations.

Under current practices, the Federal share of the needs I have just outlined for the Interstate and other systems would total at least $14.6 billion a year, more than 60 percent over the $9 billion authorized for 1982. Of this sum, the highest Federal priorities appear to be $2.9 billion for repair of the interstate, $2.2 billion for completion of the most important gaps in the interstate, $2.6 billion for primary route repairs, and $1.3 billion for bridge repairs That adds up to about $9 billion.

It should be emphasized that any assessment of future highway needs is very uncertain, both because of the inherent risks of long term forecasts and because estimates of needs partly reflect the expectation of client agencies. The fact remains, nonetheless, that sizable increases in Federal highway financing appear to be required if these needs are to be met with Federal resources.

CURRENT HIGHWAY BILLS

The Congress has two highway bills before it—one reported by this committee and one reported by the House Public Works Committee. Table 2 details how these bills differ.

THE HOUSE BILL

Earlier this year, the House Committee on Public Works reported a bill, H.R. 6211, that would increase highway authorizations by about 50 percent, to an annual average of $13.5 billion for fiscal years 1982 through 1986, roughly in line with funding the needs I have just identified. The House is currently working on a 1-year substitute bill, H.R. 6965, that will be offered after the August recess as a stopgap measure. My comments this morning refer to the earlier bill, which is the latest official House action.

By far the biggest proposed increase in the House bill is for interstate repair and reconstruction; authorizations would average more than three times the current $800 million level. Since the two categories are combined into one in the House bill, however, repair—which is a high-priority need—would compete for funds with low-priority reconstruction Thus, nationally important repairs could be deferred while locally important projects, such as road widening, took precedence. Interstate completion, the primary system, and bridge replacement receive the next largest increases in funding, generally reflecting the priorities that I discussed earlier.

The Senate bill, S. 2574, authorizes an average of $9.7 billion annually for the next 4 years. Funds for interstate repair and reconstruction are doubled from $800 million in 1982 to $1.6 billion in 1983. Bridge replacement—which is another priority need—receives only a modest increase, and no increase is made for the primary system, in which needs appear to outstrip current authorizations substantially.

As in the House bill, high-priority repair and low-priority reconstruction would compete for funds. Authorizations for other programs are essentially unchanged. If current Federal responsibilities continue, the authorizations contained in the Senate bill appear inadequate to meet the Nation's long-term highway needs.

OUTLOOK FOR THE HIGHWAY TRUST FUND

Highway users finance the Federal highway program through a series of excise taxes paid into the highway trust fund. This approach is based on the principle that those who use the Nation's highway system should support its construction and repair, not the general taxpayer. The highway trust fund is scheduled to expire at the end of fiscal year 1984, and if the Congress does not extend it before the end of this fiscal year, it will not have sufficient resources to support current program levels through 1983.

The trust fund is financed by 10 separate taxes. The most important of these is the 4-cent-per-gallon tax on motor fuels that raises $4.4 billion a year, or two-thirds of total tax receipts. Next in importance is the 10-percent tax on truck sales, which generates almost $800 million a year.

In recent years the cost of building and repairing highways has risen much more rapidly than have the available funds. While highway construction costs grew by an average of 10 percent annually during the 1970s, receipts from Federal highway user taxes grew by only about 2 percent a year as high fuel prices and improved vehicular fuel economy reduced the tax base. This trend will continue, with highway trust fund receipts projected to grow about 1.3 percent a year over the next 5 years—again, substantially less than inflation. Including interest, if current taxes are extended, the highway trust fund will generate an average of about $8.1 billion annually during the next 5 years.

If enacted as longrun policies, both the House and Senate bills would require increases in highway user fees. In the short run, however, the amount of such increases depends on the timing of costs and revenues. Authorizations can exceed trust fund receipts for a period, because there is normally a 2- to 3-year lag between the time funds are made available to the States and the time they become cash outlays. The trust fund already reflects spending in excess of receipts: Although it currently has a cash balance of $8.7 billion, unpaid authorizations exceed this amount by $10.4 billion. In the long run, of course, receipts must balance outlays. If this balance is not maintained in the short term, the Congress could be forced to raise taxes suddenly in the future to pay for past programs.

The House bill has been structured to fit with a proposal, advanced by Secretary of Transportation Drew Lewis, to increase highway taxes by an amount equal to a 5-cent-per-gallon tax on motor fuels. Such a proposal would generate roughly $4.4 billion more for the trust fund plus $1 billion for mass transit capital grants. This tax increase would not only adequately finance the

House program, it would also reduce the Federal deficit by about $3.2 billion in 1983.

The Senate bill could be financed by raising taxes $1.5 billion per year. Alternatively, it could be financed for several years by extending highway user taxes at their current rates, although this would reduce substantially the trust fund's current cash balance over the next 4 years. If the alternative were used, the Congress would face a difficult choice in fiscal year 1987: either to increase taxes substantially or to cut spending. This approach also would increase the Federal deficit, mostly in 1985 and 1986.

Instead of increasing taxes, Federal highway aid could be focused exclusively on the Interstate and primary systems and their related bridges. This would return to the States responsibility for the secondary and urban systems, including the bridges on those systems, and for all safety programs. Such an approach could result in authorizations slightly above those of the Senate bill while significantly increasing spending on the most important national roads. Although different in several important details, this option is similar in philosophy to the administration's proposals for New Federalism. While this option could avert a Federal tax increase, it would shift the pressure for larger highway taxes to State and local governments. They would face the choice of replacing almost $3 billion in reduced Federal aid or allowing the condition of some of the transferred routes to deteriorate.

IMPLICATIONS OF THE COST ALLOCATION STUDY

Turning to the implications of the cost allocation study, the Department of Transportation has recently completed a study of how highway taxes should be levied among the various groups of road users. This study represents a significant improvement over previous studies of this sort, chiefly because it has replaced the incremental method of cost allocation with a consumption-based method. The incremental method charged trucks a disproportionately small share of their costs. The consumption-based method corrects for this shortcoming and charges each group of road users an amount proportional to the wear and tear that they cause.

Because the new method assigns costs more fairly, a system of user fees based upon it would encourage efficient use of the transportation network. We believe this study provides the Congress with a sound basis for making highway tax changes. I have appended a brief technical review of the study to my prepared statement.

The highway cost allocation study shows that automobiles, pickups, and vans pay taxes roughly matching their share of Federal highway costs, but that other vehicles do not. Single-unit trucks as a group pay almost twice their fair share and should have a major reduction in their Federal highway taxes. Combination trucks, on the other hand, currently underpay by 20 percent. Within this class of vehicle, the degree of underpayment increases rapidly with vehicle size. The heaviest trucks, those over 75,000 pounds gross vehicle weight, should pay almost 70 percent more in taxes than they currently do. In effect, light trucks now subsidize heavy trucks.

Buses are exempt from most Federal taxes and pay almost nothing of their share of costs.

The committee asked us to examine three tax alternatives listed in table 6. Alternatives I and III are based, in large part, on the results of the cost allocation study. They are quite similar in their expected effects and I will discuss them together, after commenting briefly on alternative II.

The second tax proposal would raise $10.3 billion, roughly in line with the authorizations proposed by this committee. Although this tax schedule would double the use tax for heavy vehicles to $6 per thousand pounds, almost all of the $3 billion in added revenues would be raised by a 3-cent-per-gallon increase in the motor fuel tax. Because of its reliance on the fuel tax rather than a fairer distribution of user charges, alternative II would compound current tax inequities. Auto taxes would increase 51 percent, while those paid by combination trucks would rise only 32 percent. As a result, combination trucks would pay only 75 percent of their costs, compared to the 80 percent that they currently pay.

Tax options I and III would raise $12.7 billion a year—an additional $4.4 billion for highways plus $1 billion for mass transit. The first option would double the fuel tax to 8 cents per gallon, increase the taxes on both truck parts and sales to 12 percent from their current 8 percent and 10 percent, respectively, and institute a graduated version of the heavy vehicle use tax. Alternative III has a higher diesel tax and relies on a graduated heavy vehicle tax that varies with axle weight rather than gross vehicle weight.

Either alternative I or III would improve the efficiency of the Nation's transportation system and make the distribution of charges more equitable. Further improvements in the heavy vehicle use tax are possible, however, since under alternatives I and III large combination trucks would continue to underpay by 16 percent or more while single-unit trucks would overpay by 18 percent. The greatest efficiency and equity gains could be achieved by charging each group of users its full share of costs. This would mean doubling the taxes paid by combination trucks to an average of $2,850 per vehicle annually. If charged all of their costs, the heaviest combination vehicles should pay $5,000 per year, compared to the approximately $3,800 per year that they would pay under alternatives I and III.

Both alternatives depend upon substantial increases in the heavy vehicle use tax, largely because there are few other options for raising truck taxes. For example, while all trucks over 26,000 pounds now pay the same $3 per thousand pounds, alternative I would increase the tax paid by combination vehicles over 75,000 pounds to $22 per thousand pounds, an increase of $1,500. While the tax increases for the heaviest vehicles are large under alternatives I and III, the likely impact on truck operations should be quite modest. Total trucking costs, including the costs of the driver and distribution costs, are likely to rise by between 1.4 and 1.8 percent. Cost increases for other vehicle classes would be less. There is considerable variability in these numbers, however, and some vehicles may experience higher percentage increases, particularly if they are driven relatively few miles.

In conclusion, Mr. Chairman, the Nation's highway system has been neglected and needs additional work to repair existing roads and to complete the interstate system. The only long-term solutions available to the Congress appear to be a larger highway program along with increased highway taxes or a major shift in responsibility and tax burden to the states. If highway taxes are raised, the recently completed cost allocation study represents a sound basis for determining an equitable and efficient tax structure.

Thank you, Mr. Chairman.

[An appendix to Ms. Rivlin's statement follows:]

APPENDIX. COMMENTS ON THE DEPARTMENT OF TRANSPORTATION STUDY OF HIGHWAY COST ALLOCATION

Much of the debate about who should pay for roads centers on two methods of highway cost allocation. The first, called the incremental method which was used in previous studies, assigns a disproportionately small share of the cost to trucks. The second, called the consumption method, has been applied by the Department of Transportation (DOT) in its recent study, and it appears to correct the failings of the incremental method.

The new federal cost-allocation study, like others before it, bases many of its findings on engineering relationships developed by an extensive road test conducted by the American Association of State Highway Officials between 1958 and 1960. This test found that heavy vehicles cause far more pavement wear than do light ones. For example, one combination truck loaded to the current federal weight limits causes about the same pavement wear as 9,000 cars. Accordingly, as the nation's highway programs devote more of their resources to the repair of worn-out roads, the relative wear caused by different types of vehicles should figure heavily in the analysis of cost allocation.

By treating trucks differently from cars rather than reflecting the relative wear caused by different vehicles, the incremental method assigns too large a share of costs to cars. This occurs because it ignores some significant economies of scale that should enter the calculation. For example, building a pavement 11 inches deep instead of 10 inches deep nearly doubles its expected life, measured in terms of the number of loads it can carry. Even though trucks using this pavement might cause more than half of all pavement wear, the incremental method would assign them only about one-eleventh of the cost--the approximate share of cost associated with adding the 11th inch. The situation is analagous to a 1-cent sale on aspirin in which, after paying the full price for the first bottle, a second may be purchased for only 1 cent more. Rather than allocating costs based on the number of "aspirin" each user consumes, the incremental approach effectively assigns the costs of the first, full-price, bottle to cars and that of the second, reduced-price, bottle to trucks. While the distortion caused by the incremental method is not as large as this, trucks nonetheless receive preferential treatment under this approach. Accordingly, both the CBO in our technical guidelines for the study and the DOT in the final study rejected the incremental approach.

Pavement costs are only one aspect of total highway costs, and the recent DOT study is significantly improved over previous studies in several other areas as well. It incorporates a more sophisticated treatment of bridge reconstruction, and it is better in assigning grading costs.

Although the DOT study has deviated from the CBO guidelines in several areas, such changes generally reflect technical refinements in keeping with the spirit of the cost-responsibility approach outlined by the Congress in the Surface Transportation Assistance Act of 1978. For example, pavement wear has been divided into several different categories, with each allocated according to slightly different formulas based on more detailed engineering practices. Some other changes represent differences in technical judgments. For example, while the study assigns all wear-related pavement costs according to the wear caused by each vehicle type, it does fail to include certain of these costs in the pool of costs thus assigned. This is chiefly an issue for new pavements, where an unnecessarily large portion of the cost has been treated as a common responsibility of all road users.

Overall, however, the DOT study is a sound one that has removed the greatest failings apparent in previous studies. We believe that it is as reliable a yardstick as the Congress is likely to obtain for measuring the costs of each highway user group.

TABLE 1. MAJOR COMPONENTS OF THE NATION'S HIGHWAY SYSTEM

Component	Route Miles	Percent of Total Vehicle-Miles	Percent of Capital Spending Provided by Federal Government a/	Percent in Poor Condition	Percent in Fair Condition
Federal-Aid Highway System					
Interstate	41,216	19.0	91 b/	7.0	29.0
Primary c/	259,240	29.5	70	6.0	52.0
Secondary	398,108	8.7	25	9.0	66.0
Urban	124,115	21.9	20	8.0	59.0
Bridges	259,950 d/	e/	70	10.5	15.5 f/
Subtotal Federal-Aid g/	822,679	79.1	50	7.9 g/	58.7 g/
Non-Federal-Aid System					
Roads	3,034,179	20.9	e/	e/	e/
Bridges	313,700 d/	e/	e/	33.4	27.4
Subtotal Non-Federal Aid	3,034,179	20.9	e/	e/	e/
Total Roads	3,856,858	100.0	N/A	N/A	N/A

SOURCE: Federal Highway Administration Highway Statistics for 1980; and The Status of the Nation's Highways: Conditions and Performance, January 1981.

a. U. S. Department of Transportation, Final Report on the Federal Highway Cost Allocation Study (May 1982), p. iv-14. These estimates exclude maintenance.

b. Federal aid also accounts for about 90 percent of 3R (repair, resurfacing, and rehabilitation) work on the Interstate, up from 50 percent in earlier years.

c. Excludes Interstate mileage.

d. Number of bridges.

e. Not available.

f. These bridges have an adequate structural condition but either do not have sufficient capacity for existing traffic or do not meet current design standards.

g. Excludes bridges.

TABLE 2. COMPARISON OF MAJOR NATIONAL HIGHWAY NEEDS WITH HIGHWAY AUTHORIZATION OPTIONS

		Average Annual Authorizations 1983-1986 (In billions of dollars)			
Area of Need	Effective Federal Share of Spending (In percent) a/	Federal Share of Estimated Needs	New Federalism Option b/	Senate Bill	House Bill
Complete Interstate System by 1990	90	5.1 c/	2.2 c/	3.4	4.0
Interstate Repair	90	2.9 c/	2.9 c/	1.6	2.6
Interstate Reconstruction	25 d/	1.1 c/	1.9 c/		
Primary	70	2.6 e/	2.6 e/	1.6	2.2
Bridge Repair	70	1.3 f/	0.6 f/	1.2	1.7
Secondary	25	1.0 e/	0.0	0.5	0.6
Urban	20	0.6 e/	0.0	0.7	0.8
Other g/	h/	h/	0.0	0.7	1.5
Total		14.6	10.2	9.7	13.4

a. Department of Transportation, Final Report on the Federal Highway Cost Allocation Study (May 1982), p. IV-14. These represent federal share of highway spending after accounting for state-only projects.

b. Assumes turnback to states of all non-Interstate and non-Primary roads and non-Primary bridges.

c. Congressional Budget Office, The Interstate Highway System: Issues and Options, a CBO Study (June 1982).

d. Congressional Budget Office assumption.

e. Federal Highway Administration, The Status of the Nation's Highways: Conditions and Performance, January 1981, Table 5-1, p. 154 with adjustments by the Congressional Budget Office to reflect inflation and changes in the effective federal share. Assumes a 15-year program with future adjustments for inflation.

f. Federal Highway Administration, Highway Bridge Replacement and Rehabilitation Program, Third Annual Report to the Congress, (March 1982). Assumes a 15-year program with future adjustments for inflation and is restricted to the Federal-Aid System for the needs estimate and the Interstate and Primary for New Federalism.

g. Includes Interstate transfer grants for highways, safety grants, recreational roads and roads off the Federal-Aid System.

h. Not available.

TABLE 3. CURRENT HIGHWAY EXCISE TAXES AND ANTICIPATED RECEIPTS TO THE HIGHWAY TRUST FUND

Tax	Current Rate a/	Net Projected Revenue for 1982 (In millions of dollars) b/	Percent of Total Tax Receipts
Motor Fuels			
Gasoline	4 cents per gallon	3,969	60.1
Diesel	4 cents per gallon	597	9.0
Special motor fuels	4 cents per gallon	c/	c/
Total, Motor Fuels		4,566	69.1
Rubber			
Tires	10 cents per pound	617	9.3
Tubes	10 cents per pound	25	0.4
Retreads	5 cents per pound	25	0.4
New Trucks and Trailers (Over 10,000 pounds gross weight)	10 percent of manufacturer's wholesale price	771	11.7
Annual Heavy Vehicle Use Tax	$3 per 1,000 pounds when gross weight exceeds 26,000 pounds	289	4.4
Motor Vehicle Parts and Accessories	8 percent of manufacturer's wholesale price	231	3.5
Lubrication Oil (For highway use)	6 cents per gallon	80	1.2
Total		6,604	100.0

a. Most of these rates will drop as of October 1, 1984 unless the Congress extends them. For example, the motor fuels tax will drop to 1.5 cents per gallon, the new truck and trailer sales tax to 5 percent, and the heavy vehicle use tax will expire.

b. Office of Tax Analysis, Department of Treasury, July 19, 1982.

c. Included with diesel.

TABLE 4. TREASURY FORECAST OF HIGHWAY TRUST FUND TAX RECEIPTS (By fiscal year, in millions of dollars)

Tax	1980	1983	1984	1985	1986	1987	Annual Growth Rate 1980-1987 a/
Gasoline (Net)	3,898	3,823	3,762	3,713	3,647	3,669	(0.9)
Diesel	523	608	645	681	719	758	5.4
Total Motor Fuel	4,421	4,431	4,407	4,394	4,366	4,427	0.0
Truck Sales	912	1,055	1,395	1,487	1,684	1,795	10.2
Truck Parts	253	277	301	322	344	367	5.5
Heavy Vehicle Use Tax	277	268	273	278	282	286	0.5
Tires, Tubes, and Tread Rubber	680	670	673	680	682	698	0.4
Lubricating Oil (Net)	77	80	80	80	80	80	0.5
Total Excise Taxes	6,620	6,781	7,129	7,241	7,438	7,653	2.1
Interest on Cash Balance b/	1,027	1,040	950	880	780	740	(4.6)
Total Highway Trust Fund	7,647	7,821	8,079	8,121	8,218	8,393	1.3

SOURCE: Office of Tax Analysis, Office of the Secretary of the Treasury, July 19, 1982.

a. The year 1980 is used as a base since the recession has distorted receipts for 1981 and 1982, particularly in truck sales.

b. Estimate by Congressional Budget Office assuming no change in the cash balance in the fund and using CBO's forecast of interest rates.

TABLE 5. SUMMARY OF RESULTS FROM DOTs HIGHWAY COST ALLOCATION STUDY (In dollars per vehicle for 1985)

Vehicle Class	Current Highway Program		Change in Taxes for Equitable Allocation a/	Change in Taxes to Generate Additional $4.4 billion	Resulting Payments for $11.7 billion in Revenues
	Payments a/	Costs			
Automobiles	25	26	1	16	42
Buses	6	191	185	115	306
Pickups and Vans	40	37	-3	22	59
Single-Unit Trucks	253	128	-125	77	205
Combination Trucks	1,411	1,778	367	1,072	2,850
Over 75,000 pounds	1,819	3,101	1,282	1,869	4,970
All Vehicles	46	46	0	28	74

NOTE: Estimates based on program mix assumed by DOT's cost allocation study. A shift in effort towards more reconstruction or away from local roads, as proposed by H. R. 6211 and by S. 2574, would probably increase the cost responsibility of combination trucks relative to lighter vehicles.

a. Total revenues estimated at $7.3 billion.

TABLE 6. COMPARISON OF TAX ALTERNATIVES PRESENTED BY SENATE PUBLIC WORKS COMMITTEE

Vehicle Class	Current Highway Program		Alternative 1		Alternative 2		Alternative 3	
	Tax Payment (In dollars per vehicle)	Ratio of Payments to Costs	Tax Payment (In dollars per vehicle)	Ratio of Payments to Costs	Tax Payment (In dollars per vehicle)	Ratio of Payments to Costs	Tax Payment (In dollars per vehicle)	Ratio of Payments to Costs
Automobiles	25	0.97	48	1.02	38	1.04	50	1.05
Buses	6	0.04	6	0.02	10	0.04	10	0.03
Pickups and Vans	40	1.08	70	1.06	55	1.07	71	1.03
Single-Unit Trucks	253	1.99	260	1.18	333	1.86	250	1.13
Combination Trucks	1,411	0.80	2,744	0.94	1,870	0.75	2,642	0.90
Over 75,000 pounds	1,819	0.59	3,838	0.76	2,305	0.60	3,753	0.74
All Vehicles	46	1.00	80	1.00	64	1.00	80	1.00

SOURCE: Federal Highway Administration, Office of Program and Policy Planning, Transportation and Socio Economic Studies Division.

Senator SYMMS. Thank you very much for your testimony.

I guess you didn't voice a preference for alternative I, II, or III. You just gave us what your analysis of those three were. Is that correct?

Ms. RIVLIN. That is right. However, alternatives I and III seem to us more in line with the results of the cost allocation study—they were devised that way—and more in line with fair distribution of the burden than alternative II.

Senator SYMMS. Do you feel that the figures with the cost allocation study, or the methodology, was satisfactory from your point of view?

Ms. RIVLIN. Yes, we do. We are really very pleased with the way the study was conducted.

As you remember, we were asked to provide guidelines roughly laying out the methodology. We suggested the switch away from the incremental method and toward a consumption-based or wear-and-tear-based method. The Department has in fact done that. We have minor differences with the way the methodology was carried out, but it seems to us basically a very good study.

Senator SYMMS. The truckers, when they testified, made a pretty clear case that the wear base method used in the highway cost allocation study attributes all damage to the vehicles, even though the roads would require replacement due to weather, climate, time of use, and so forth. So they make the point that why should a truck pay any more than a car does for costs attributable to those factors? How do you answer that?

Ms. RIVLIN. We don't think that is a fair criticism. Damage that is caused purely by weather was allocated to common costs by the study. Much weather damage results from a combination of weather and use. Winter damage to a highway is compounded by being rolled over by heavy trucks. So in our view, the Department correctly allocated that combination of weather and use to the vehicles causing the damage.

My colleagues might want to comment on that.

Senator SYMMS. I suppose if we increase the——

Ms. RIVLIN. Excuse me, Mr. Chairman. I failed to introduce my colleagues. Let me do that at this point. Damian Kulash, on my right, and Richard Mudge on my left, are transportation experts in CBO's Natural Resources and Commerce Division.

Damian, do you have a comment on that?

Mr. KULASH. No. I believe you covered it.

Senator SYMMS. Welcome, both of you.

I suppose we face the age-old difficulty that all of us in the Congress are faced with right now with respect to the current tax legislation that has created so much national interest that the President spoke to Monday night. If we increase truck taxes greatly, ultimately, I suppose, we pass those costs on to the consumers, so it will cause increased pressure on prices of transportation.

Ms. RIVLIN. To a small extent, yes. To the extent that there is unused capacity in the trucking industry, some of it will come out of profits. In general, if costs are increased for trucks, they will eventually be passed on to the consumer. But it is not a major item. In our view, the percent of operating costs that would be occasioned by even the higher level of heavy truck taxes would be in the range of 1 or 2 percent.

Senator **Symms**. I thank you very much.

Senator Stafford?

Senator **Stafford**. Thank you, Mr. Chairman.

I have just one question at this point, and that is, Ms. Rivlin, how important a concern do you believe equity-based cost allocation to be, and how equitably do you think the DOT study allocates cost amongst the various highway user groups?

Ms. **Rivlin**. I think equity is important, both from a fairness point of view, and more importantly from an efficiency point of view. Our transportation system ought to be geared to charging the consumer of transportation for the true costs of the various modes. From that point of view, it is important.

In our view, it is very hard to do these things, but the Department of Transportation study seems to us a major improvement on past studies and a good basis for allocation.

Senator **Stafford**. Thank you very much.

Thank you, Mr. Chairman.

Senator **Symms**. Thank you very much.

Ms. **Rivlin**. Thank you, Mr. Chairman. If there is anything else we can do for you, let us know.

Senator **Symms**. I was going to say we may have some questions to submit to you in writing. But we won't keep you here this morning. Thank you for being here. We appreciate your testimony and the work you have obviously put into this. I think it will be very helpful for our resolution of this problem. Thank you.

Ms. **Rivlin**. Thank you.

Senator **Symms**. Our next witness is Greg Ballentine, Deputy Assistant Secretary for Tax Policy, Department of the Treasury.

Mr. Ballentine.

STATEMENT OF GREG BALLENTINE, DEPUTY ASSISTANT SECRETARY FOR TAX POLICY, DEPARTMENT OF THE TREASURY

Mr. **Ballentine**. Mr. Chairman and members of the committee, I am pleased to appear before you to discuss possible changes in the highway excise tax structure I will just summarize my statement and, with your permission, submit the complete statement for the record.

Senator **Symms**. Without objection, it will be made part of the record.

Mr. **Ballentine**. The changes under consideration by the committee involve both increases in the total amount of revenue to be collected from highway user taxes and shifts in the relative tax burdens imposed on different groups of users.

The Treasury Department is opposed to increases in highway excise taxes at this time. At currently budgeted spending levels, the existing tax rates should provide sufficient revenues to maintain an adequate balance in the Highway Trust Fund for the next few years.

While the Treasury Department does not support an increase in the level of highway taxes at this time, we strongly support continued reliance on user taxes to finance highway program costs. We currently are studying proposals to alter the structure of highway excise taxes so as to aline the tax burdens more closely with the relative costs imposed on the system by different classes of users. We also are studying changes in the highway excise tax structure that would improve administration and compliance without sacrificing significant revenue.

In principle, the share of highway taxes borne by different highway users should be correlated with the share of costs each user imposes on the system. To the extent that some highway costs cannot be separately attributed among users, tax shares should roughly correspond with the amount of highway use.

The Department of Transportation study on cost allocation concludes that under the current system of highway excise taxes, single-unit trucks and light combination trucks pay a tax share substantially exceeding their cost share while the tax shares of heavy combination trucks and buses are significantly less than the relative costs they impose on the highway system. Autos, pickups, and vans pay taxes roughly in line with their cost responsibilities.

The Transportation study considered three principal options for shifting the burden of the tax structure in line with cost responsibilities: Raising the taxable weight threshold of the manufacturers' excise taxes on heavy trucks and truck parts and accessories, introducing a differential diesel fuel tax on fuel used in heavy trucks, and raising the threshold and increasing the rates on the heavy vehicle use tax.

The Treasury Department is currently considering the advantages and disadvantages of these proposals. Of course, no single tax can accurately match tax burdens with cost responsibilities. The Treasury believes that only a user fee structure composed of several separate taxes can assess vehicles their fair share without incurring unacceptable administrative and compliance difficulties.

An increase in the heavy-vehicle use tax along the lines proposed by this committee would improve the allocation of taxes among classes of users, defined as vehicle types, but would introduce some new inequities and inefficiencies. Because the heavy-vehicle tax is imposed at the same rate on all registered vehicles in a given weight class regardless of the amount of miles the vehicle is driven, it would discriminate against users with relatively low annual mileage.

In contrast, diesel fuel taxes do vary with the amount of highway system use by individual operators. However, diesel fuel taxes at rates sufficient to impose a larger share of the desired burden on heavy trucks would also cause lighter diesel powered vehicles to overpay.

Both increased heavy-vehicle use taxes and higher diesel fuel taxes would increase problems of enforcement. Since the Federal Government has no current information on truck registration, collection of the heavy-vehicle use tax relies almost entirely on voluntary compliance. Higher tax rates on annual vehicle registrations would both increase the incentives for and worsen the consequences of noncompliance. The Department of the Treasury and the Internal Revenue Service are exploring possible ways of reducing compliance problems by enlisting the cooperation of the States in enforcing the tax.

Further, substantially higher diesel fuel taxes would increase enforcement problems because they would provide strong incentives to divert fuel from untaxed uses; for example, home heating oil.

We are continuing to examine the merits of increasing the share of highway revenues raised by a restructured heavy-vehicle use tax and by taxes on diesel fuel. We look forward to working with the committee on any proposals in this area. Thank you.

Senator STAFFORD [presiding]. Thank you very much, Mr. Ballentine.

I note in your statement that it says:

> Under the current system of highway excise taxes, single-unit trucks and light combination trucks pay a tax share substantially exceeding their cost share, while the tax shares of heavy combination trucks and buses are significantly less than the relative costs they impose on the highway system.

I am sure you are aware that the heavy-truck industry has a different view of that position.

Mr. BALLENTINE. Yes, Senator.

Senator STAFFORD. I am unaware of the reason, if there is one, in accordance with Ms. Rivlin's statement, that is virtually all buses are exempt from bearing a share of the cost of the highway system. Do you have any explanation of that situation?

Mr. BALLENTINE. No, Senator, I don't right now. As a matter of fact, all of the exemptions are under study by the Treasury. We think they deserve serious consideration.

Senator STAFFORD. I gather from your testimony you think it would be easier, in cooperation with the States, not to use an axle-weight system of user charges but to base the charges on the registered weight of the vehicle. Am I correct in that?

Mr. BALLENTINE. Yes. As it stands right now, Senator, the problem appears to be that many States simply don't gather that data on axle weight as they register but more do gather registered weight data.

Senator STAFFORD. Section 507 of the Surface Transportation Assistance Act of 1978 directed the Secretary of Treasury to make certain recommendations to Congress on the administration of highway user fees by April 15, 1982. Do you know when the Department will be submitting this report?

Mr. BALLENTINE. Yes, Senator. We should be submitting that report within 6 to 8 weeks.

Senator STAFFORD. Thank you very much.

Thank you, Mr. Chairman.

Senator SYMMS [presiding]. Thank you very much, Mr. Chairman. I appreciate having you here this morning.

Do you believe there are any existing highway user fees which should be eliminated?

Mr. BALLENTINE. We are certainly looking at that option. I believe in particular the lubricating oils tax is one that has very little compliance essentially with the tax. It seems to be a large nuisance. We are certainly examining that option. That is one example.

Senator SYMMS. With the administration being on record as strongly in support of user fees, particularly in the areas of transportation, there has been considerable attention given to increased fees for users of waterways and airways, how does that present commitment to user fees affect highways which have traditionally been user-fee financed? In other words, why the resistance to highway user fees but you want to stick it onto the waterways?

Mr. BALLENTINE. I don't think I would want to phrase it as a resistance to highway user fees. There is a current resistance to increasing highway user fees, and the major reason is the current level of the Fund does not immediately make such a change necessary. But the structure of user fees is something we are studying and are committed to, and the continued use of user fees for the Highway Trust Fund is again a strong commitment.

Senator SYMMS. Could you explain for our record how the heavy-truck use tax is computed and collected currently?

Mr. BALLENTINE. The heavy use tax is computed essentially by the individual taxpayer. It is information he gets as he purchases the truck. This is unloaded weight, as I recall. He files a form I believe in the month of July of every year which states the vehicle weight and then multiplies that weight by the appropriate tax.

I perhaps should provide a more detailed answer for the record.

Senator SYMMS. That would be fine. If you would, we would appreciate that.

Mr. BALLENTINE. Yes, sir.

[The information requested follows:]

The tax is based on the actual unloaded weight of a highway motor vehicle. This means the empty (tare) weight of the vehicle fully equipped for service. The Internal Revenue Service provides taxpayers with a chart which shows the tax due for each category of highway type truck, truck tractor, or bus. The tax per vehicle is prorated according to the month of the tax period in which the vehicle is first used on public highways. The tax is collected from the person in whose name the truck, truck tractor, or bus is registered or required to be registered.

Senator SYMMS. How much revenue lost to the Highway Trust Fund do you think there is by those who avoid paying that tax?

Mr. BALLENTINE. I don't have figures on that right now. The Internal Revenue Service is studying issues of compliance there, and that study will soon be completed. Our current information is the revenue lost is not enormous, but there is almost certainly some revenue lost in that area.

Senator SYMMS. Do you have any recommendations for how to remedy the loss, if it is significant?

Mr. BALLENTINE. We are looking at the possibility, as I mentioned a minute ago, of cooperating with the States in the collection of that tax since individuals have to register their trucks annually, and presumably there is much less noncompliance on that kind of registration than there might be with the purely voluntary compliance with the heavy use tax. Working with the States is something under active consideration. But again, it is something being studied right now by the Internal Revenue Service.

Senator SYMMS. I might just say in closing, unless there are other questions—then we will be ready to let you go—you might take the message back to Treasury that I was very disappointed that the President did not choose to include taking this step right now and getting this behind him, what I view as something that is necessary, and that is increasing the users fee for the highway trust fund in this present tax package. I think it was a mistake that he didn't do it. But I feel that it is obvious from your testimony that on the advice of Treasury and other parts of the Government, he made a decision not to do so at this time. But do you anticipate that Treasury is going to continue to oppose an increase in user fees for the trust fund? That may change after November, or will it?

Senator BENTSEN. I came in at the right time.

Senator SYMMS. This Senator is running for reelection, so we will wait until after the election to ask him to vote.

Senator STAFFORD. You have two running, as a matter of fact.

Senator SYMMS. That is right, there are two.

Senator BENTSEN. But you also have a Senator who strongly supported the highway program and a user fee and it ought to be expended for that purpose and obviously it will have to be increased. How is that for a pre-election statement?

Senator SYMMS. Good. That is what we like to hear.

Now, the question is: Do you anticipate that this resistance of Treasury may change?

Mr. BALLENTINE. I really couldn't say at this time. It would depend certainly partially upon our study. But I really wouldn't want to say beyond that what the position of the Treasury would be on that in the future.

Senator SYMMS. I would hope they would recognize that the highway trust fund and the highway system in the country is not a partisan issue, it is an issue that I believe we have an obligation to fulfill, that it is not going to benefit any Americans to allow the highway system to go to potholes.

I appreciated the realistic testimony that CBO gave in recognizing that there is not enough money to meet the needs. Maybe you drive on different roads to work than I do, but check out some of the routes and maybe then the next time we can get testimony that would be consistent with the President's program, which would call for fulfilling those basic infrastructure needs.

Do you have any questions, Senator Bentsen?

Senator BENTSEN. No; thank you very much.

Senator SYMMS. Thank you very much, Mr. Ballentine, for being here. We do appreciate having you.

Mr. BALLENTINE. Thank you, Senator.

Senator SYMMS. Our next witness is Mr. Ray Barnhart, Administration of the Federal Highway Administration, accompanied by Tony Kane and Les Lamm.

Gentlemen, welcome to the committee. It is always a pleasure to have you up here.

Go right ahead, Ray. Glad to have you here.

STATEMENT OF RAY BARNHART, ADMINISTRATOR, FEDERAL HIGHWAY ADMINISTRATION, ACCOMPANIED BY TONY KANE, CHIEF, TRANSPORTATION AND SOCIOECONOMIC STUDIES DIVISION AND LESTER P. LAMM, EXECUTIVE DIRECTOR

Mr. BARNHART. Thank you, Mr. Chairman and members of the committee. I do have a statement I would like to read. Even though it is somewhat lengthy, I will do it rapidly. Then I will submit a more thorough statement for the record.

Senator SYMMS. Without objection.

Mr. BARNHART. I am pleased to appear before this committee to discuss the vital issues of highway needs, allocation of highway program costs among users, and possible modifications to the current set of Federal highway user charges. With me today are Mr. Lester P. Lamm, Executive Director of the FHWA and Mr. Anthony Kane, Chief of the Transportation and Socio-Economic Studies Division who directed the cost allocation study. We will be happy to respond to your questions at the conclusion of the testimony.

Secretary Lewis, incidentally, asked me to extend his thanks to the subcommittee for holding hearings on these important issues. Although he could not be present today, he asked me to seek permission of the committee to place his written statement in the transcript. His statement supports the findings of the cost allocation study and calls attention to the growing rehabilitation needs on our Nation's highway system and the need for additional future revenues.

As the committee is well aware, and as Senator Symms' opening statement indicates, many crucial Federal-aid highway issues must be resolved. FHWA endorses Senator Symms' opening statement regarding the critical nature of our Nation's highway needs. We believe that the major issues of program authorization levels, highway user fees, and truck sizes and weights are related and should be considered together. I want to add, incidentally, productivity gains for trucking are also a part of this in order to avoid further financial injury to this national industry.

My full statement is submitted for the record.

The present study has been done in strict accordance with Congress wishes as set forth in the 1978 Surface Transportation Assistance Act. Congress asked for a study of the costs occasioned by different vehicles in the design, construction, rehabilitation and maintenance of Federal-aid highways, and that is what we have produced.

The method for assigning the costs occasioned by vehicle groups used in the present study differs considerably, especially for pavement-related costs, from that used in the previous major Federal study. The new methods were selected because they are technically superior, not because they favor one group over another. The DOT staff had no preconceptions about what group was under or overcharged. The staff had no desire and no motive for favoring one group over another.

Under a cost-occasioned approach, each element of highway cost is examined to determine what portion is caused by the use of vehicles of each type. Since the use of highways by heavier vehicles causes us to build stronger, more expensive bridges, for example, heavy vehicles are assigned higher bridge cost responsibility per vehicle-mile of travel than are lighter vehicles.

Roughly half of expected Federal highway costs were not, however, found to be caused by specific vehicles, though they are ultimately traceable to vehicle travel generally. The cost of purchasing right-of-way, for example, fits into this category. These costs are termed "residual costs." In the current cost allocation study, all such costs were assigned equally to each mile traveled by any vehicle. This choice of vehicle-miles traveled is somewhat arbitrary and was made in lieu of other travel measures that would have charged trucks more.

The approach taken to allocate pavement costs in the past is no longer appropriate. For new pavements, the old approach is inadequate because it does not properly incorporate broadly accepted pavement design theory and practice. The old approach charges lighter axles far more per unit of required pavement thickness than it does heavier axles. There is no justification for doing so by any of our pavement design procedures. Our approach rectifies this inequity and charges all vehicles equally for each unit of pavement thickness that they require.

For pavement restoration, which is expected to consume 35 to 40 percent of future trust fund outlays, the old incremental method is simply inappropriate. The relevant issue is why the pavement to be replaced has worn out. This issue is addressed explicitly in the current study through the use of deterioration or consumption relationships. CBO had suggested that we use this approach, and the overwhelming majority of recent State and foreign studies focus on causal factors involved in rehabilitation costs of existing facilities to assign cost responsibilities as we have.

Unlike the old incremental method, the approach we have used specifically accounts for the effects of age, weather, and other environmental factors on the deterioration of pavements. If anything, we have erred on the side of including too many nonload variables.

As for the user fee side of the cost-allocation issue, present Federal highway user taxes will need revision both because their overall yield is not keeping pace with program needs and because they do not distribute. the tax burden equitably among the vehicle groups.

The total annual yield from present highway user fees has fallen in recent years from a 1979 peak of $7.2 billion to $6.3 billion in 1982, and the yield is forecast to rise only slightly over the next few years. This tax structure greatly undercharges some vehicle groups and overcharges others. For example, the heaviest class of combination trucks, those with a gross weight greater than 75,000 pounds, would pay only 60 percent what they owe in 1985 while single-unit trucks other than pickups and vans would pay twice what they owe.

The key to making Federal highway user fees more equitable is to graduate some tax rates with vehicle weight or axle loads to make the heaviest combinations pay more while exempting more light-weight trucks from some taxes to reduce their overpayments.

The general outlines of the required user fee changes are clear, but there is considerable room for debate about which tax is the least administratively burdensome and otherwise onerous. Further, no tax rates can be set until a decision is made on the total amount of money that user charges should raise each year.

Mr. Chairman, this concludes my statement. I hope that the members of the committee find our study useful as they deliberate on highway user charge and revenue needs issues. This study by no means represents the last evaluation of factors influencing highway costs. We are confident, however, that it represents the most up-to-date and equitable approach to analyzing these issues. We would be happy to answer any questions that you may have.

Senator SYMMS. Thank you very much.

I might just ask the first question. Do I understand you wish to insert in the record a statement by Secretary Lewis?

Mr. BARNHART. Yes, sir.

Senator SYMMS. It is entitled "Statement of Secretary of Drew Lewis Before the Senate Environment and Public Works Committee, Transportation Subcommittee, Concerning Highway Needs versus Existing Revenues, August 18, 1982."

Without objection, we will insert that in the record immediately following your statement.

Mr. BARNHART. Thank you.

Senator SYMMS. Senator Bentsen?

Senator BENTSEN. I am very pleased to see Mr. Barnhart back here again. He had had a very distinguished record in Texas before he arrived here. I am pleased with the job he is doing.

I might just express my concern about what is happening to the infrastructure of this country. I am not just talking about highways or bridges or dams or ports, but across the whole infrastructure. Unless we continue the investment there, we are going to see a deterioration that will be very difficult to recover from. It will cost a lot more to do it at a later date if we don't keep up the maintenance that we have to and take care of some things that have aged to the point that they no longer can meet the needs. I looked at that situation on dams where we have some very serious dangers, and yet we have not faced up to them. We wait for a catastrophe to do something. I see what is happening to our highway system and our bridges, and frankly I think the previous administration and this administration have waited too long to try to correct that. They have done some short-term things to try to meet short-term objectives and have not devoted the attention they should to this.

Let's get to some of these questions that I have been hearing, some of the objections. I would like your judgment on them.

The trucking industry maintains that the increased user fee for them, as inferred by this study, would be a substantial hardship for them. Can you give me a feel as to how much it would increase the cost of operation for the trucking industry?

Mr. BARNHART. I believe it is about 1 to 2 percent.

Tony, do you have the figure on that?

Mr. KANE. We estimated that based on the alternatives that the committee had sent out with the invitational letter, alternatives I and II, that the operating costs of the trucks can increase in the neighborhood of 3 percent. However, operating costs are only about 30 percent of their total costs. Our estimates of the total costs, therefore, are in the neighborhood of 1 percent.

Senator BENTSEN. Operating costs are only about what now?

Mr. KANE. About 30 percent of total cost. Vehicle operating costs exclude driver's wages, overhead, terminal costs, and so forth. So our estimate would be in the neighborhood of 1 percent for the kinds of tax alternatives that the committee had sent out in the invitational letter.

Ms. Rivlin testified it would be in the neighborhood of 1.2 to 1.8 percent. Somewhere between 1 and 2 is our estimate.

Senator **Bentsen**. What does the trucking industry say? What is their side of the story on that? Have you heard?

Mr. **Kane**. The numbers I think are in accordance with the kinds of numbers they have also indicated. Their comments would, of course, be couched on the basis of the condition of the industry at this time, and on their ability to absorb increased costs at a time of economic downturn. I think the numbers are consistent with the kinds of estimates they made.

Mr. **Lamm**. Senator Bentsen, in some of the statements from the trucking industry that I have heard, they concentrate on the absolute increase in tax burden as opposed to putting it in terms of total operating revenues which Mr. Kane and Dr. Rivlin have done this morning.

Senator **Bentsen**. Do they give credit for the tire damage, truck damage, encountering potholes, and the rest of it?

Mr. **Barnhart**. In offset, you mean?

Senator **Bentsen**. Yes. Is that figured into the numbers?

Mr. **Lamm**. I think in general, to the extent that the trucking industry certainly accepts first hand the need for an improved highway system. Obviously, that comes from an accumulation of vehicle damage and lost schedules and so forth as the highway system deteriorates.

Mr. **Kane**. I believe your question is referring to the fact that if you have an increase of 1 or 2 percent in the costs imposed on trucking, would there be some offset. In fact, if we have increased outlays for highways, roads will be improved and the operating costs of trucks should decrease.

Senator **Bentsen**. Has it been figured in that number?

Mr. **Kane**. No. That would be an offsetting circumstance.

Senator **Bentsen**. So what you have as a static number is what has been given to me.

Mr. **Kane**. That is correct.

Senator **Bentsen**. Without the feedback.

Mr. **Kane**. That is correct.

Senator **Bentsen**. All right.

I have seen reports that traffic congestion is costing motorists about $800 a year in time and gasoline. Then I read the other costs of deteriorated highways costing motorists over $200 million in tire and vehicle damage. Do you think those figures have some validity to them?

Mr. **Barnhart**. The extent of it I have not testified to. Tony, you may have something. I don't think there is any question of the severity of cost caused by ignoring the situation. I think we will spend more by ignoring it, than by addressing the issue.

Mr. **Kane**. We have just recently finished a study; the information is not very good with regard to fuel consumption data and pavement deterioration. However, we have pretty good information on other factors regarding the vehicle, such as wear and tear and tire damage. We could provide more information on that. I don't have a dollar figure here.

Mr. **Barnhart**. Senator, we recognize the financial situation of the trucking industry. It is certainly a very vital industry on which our whole economy is dependent. This is why in our total proposals we have a linkage between truck size and weight and productivity gains along with the increase in the percentage of burden that the trucking industry must bear. I think all of these things have to be linked together if we are going to be successful in increasing this revenue picture and addressing highway needs.

Part of that refers to section 19 of the Motor Carrier Act of 1980 study. The complexity of permitting, to simply carry your commodity across this country, is a national disgrace. When you have several hundreds of permits that you have to fight for in order to carry one product across the country, it is a disgrace. It adds a tremendous fiscal burden to the trucking industry and ultimately to the consumer.

I think all of these things have to be addressed in a package in order to successfully gain the support of the trucking industry, if you will, politically, for the increase in the user fee.

Senator BENTSEN. I note a number of States have put in a weight-distance tax.

Mr. BARNHART. Yes, sir.

Senator BENTSEN. What do you think are the advantages or disadvantages of that? Does it have any application from the Federal standpoint?

Mr. LAMM. At present, Senator Bentsen, 10 States have a weight-distance type of tax, including Idaho, Senator Symms' State. The advantages are that, theoretically at least, it more closely represents the actual impact on road system deterioration. That is, a loaded truck theoretically puts more damage on the overall highway system if it travels 100,000 miles a year as compared to a similarly loaded truck that travels 20,000 miles.

At the Federal level, the previous witness from the Treasury Department indicated that the Treasury Department and the Internal Revenue Service are looking at variations of the weight-distance tax. A consideration they would include in their equation on that issue would be whether or not the tax could be equitably collected at the Federal level.

Senator BENTSEN. How about enforcement?

Mr. LAMM. Well, enforcement and collection is a paired issue. I believe both Treasury and we feel that to the extent it is considered at all, it would have to be accompanied with a proposal to involve all the States.

Senator BENTSEN. But you are equating it with the word equitable. There are a lot of inequitable things that can be collected. I have seen that in the tax system.

Mr. BARNHART. I think we all feel that if it is possible at all, enforcement would have to be done with the agreement and with the participation by the individual States.

Senator BENTSEN. What percentage of the truck use excise tax is not being collected, and what methods should be instituted to collect those taxes? We have just had some examples in interest and dividends.

Mr. LAMM. Again, that is within the purview of the Treasury Department who administers the highway trust fund rather than the Transportation Department.

The previous witness estimated that there was some current slippage in collections. We have seen estimates that might range anywhere from 15 percent to 30 percent slippage. But I can't personally attest to that because we are not involved in the enforcement.

Senator **Bentsen**. I have quite a number of other questions I would like to submit. I note a vote has just been called for. I have been monopolizing the time. So I will submit the rest of them.

Senator **Symms**. Senator, you have been asking questions that needed to be asked. We appreciate that very much.

Do you have any questions, Senator Stafford?

Senator **Stafford**. I have just one at this point, seeing that we do have a rollcall vote going. That is something I brought up earlier.

The DOT cost allocation study has been criticized as being biased against heavy trucks. I have had that view personally expressed to me, as a matter of fact.

Mr. **Barnhart**. I have heard that too, Senator.

Senator **Stafford**. How do you respond to the criticism?

Mr. **Barnhart**. I think it is an invalid criticism. I understand where they are coming from. We have great sympathy for the problems they face. That is why, as I have talked about the need to increase their share of the cost of the program, I have always urged that we address the issue of productivity gains in size and weight and the simplification of the permitting process.

Senator **Stafford**. Thank you very much.

Thank you, Mr. Chairman.

Senator **Symms**. Thank you very much.

We will submit more questions to you in writing and allow you to leave. We do have a vote on on the floor, so we won't hold you here.

We appreciate your testimony very much. And thank you, Senator Stafford and Senator Bentsen.

We will stand in recess for 10 minutes.

[Brief recess.]

Senator **Stafford** [presiding]. Will the subcommittee please come to order?

The first panel consists of Mr. John Clements, Mr. Robert Hunter, Mr. Harold King, and Mr. John Kemp.

Gentlemen, I invite you to the witness table. For the subcommittee and the full committee, I welcome you here.

We are starting to save your time and ours. Technically this subcommittee meeting becomes illegal in 35 minutes. If nobody raises the issue, I don't think the subcommittee is going to. But, we would invite you to summarize your statements, place the full statements in the record, and the Chair will say now that the full statements will appear in the record in full.

As you are listed, Mr. John Clements, president of the American Association of State Highway and Transportation Officials, as well as commissioner of the New Hampshire Department of Public Works and Highways, is listed first. Do you wish to go first, Mr. Clements.

Mr. **Clements**. Yes. Mr. Chairman.

STATEMENTS OF JOHN CLEMENTS, PRESIDENT, AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, AND COMMISSIONER, NEW HAMPSHIRE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS; ROBERT N. HUNTER, CHIEF ENGINEER AND CHIEF ADMINISTRATIVE OFFICER, MISSOURI HIGHWAY AND TRANSPORTATION DEPARTMENT; HAROLD KING, SECRETARY, VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION, ACCOMPANIED BY BILL LANDSIDLE AND GARY ALLEN; AND JOHN B. KEMP, SECRETARY, KANSAS DEPARTMENT OF TRANSPORTATION

Mr. CLEMENTS. Thank you, Mr. Chairman. I think as you can appreciate from your experience in your State that highway commissioners, as secretaries of transportation, are used to being on the firing line. We get the message in a hurry. So, we will try to get our testimony over in our allotted time.

As you recognized, on my far right, your far left, is Commissioner King from Virginia. Next to him is Bob Hunter, Missouri; and John Kemp, secretary from Kansas. On my far left, your right, is Bill Druhan from the AASHTO staff. With Mr. King, sitting in back of us, are Gary Allen, highway research economist, and William Landsidle from the commonwealth of Virginia as staff backup for Commissioner King's position.

I am not going to read our statement, Mr. Chairman. I would like to submit it. I think you have it for the record. I will refer to parts of it in a narrative as I go along. I won't take the time to read it.

I think in looking at last week's testimony and in looking so far at what you have heard today just about everything has been covered. I don't think you want to be hearing it over and over again in terms of needs.

As you have observed, I am commissioner of the New Hampshire Department of Public Works and Highways and this year's president of AASHTO. We are delighted to be here on the study for needs and revenues and the equity of disbursements of those revenues.

The States that are here testifying today are only the tip of the iceberg, if you will. We hope that we can represent the States' interests, even though there are some positions that haven't been fully voted on at the AASHTO Policy Committee in relation to the cost allocation study. But we are going to have people at the hearings later on in Salt Lake City and Lewiston, Idaho, from the more Western States. We hope from those three hearings you will get a pretty good consensus of what States' views are.

I would like to say at the outset, Mr. Chairman, even in Senator Symms' absence, but certainly since you are here particularly as chairman of the overall committee, that we appreciate your outspoken support for the needs of the States and certainly Senator Symms' statement just before he had to go out and vote. It is heartening to hear that kind of support from your committee and the fact that the message of our needs has really gotten through.

As a perspective, I think what you would like to hear from us really is what the professional engineers in the States have been doing in behalf of the States. As you well know, the States develop the standards, design the highways—either themselves or through consultants—and construct and maintain those highway systems with a strong and abiding partnership from the Federal Highway Administration. It has been referred to as probably one of the best partnerships in Government. I think we in the States really believe that. So that the partnership really between the Congress and the States and the Federal Highway Administration is something that we take great pride in.

As I said at the outset, I don't think we want to duplicate testimony but want to concentrate on something perhaps that hasn't already been said in terms of the engineering part of the cost allocation.

As perhaps you know, Mr. Chairman, this is probably one of the best coalitions supporting highway interests, supporting increased user fees and the needs studies that has probably ever been assembled in Washington in recent years. There seems to be absolute unanimity, even including the trucking industry, on the needs aspect. There may be some differences of opinion as to what equity is. But there is no difference of opinion that I can find in Washington as to what the current status is and what the revenue base really needs to be.

We have participated in the so-called ATAC I and ATAC II study, submitting those figures for that study, as well as FHWA. It is heartening to note that one of the activity groups here in Washington that we were most concerned about several month ago, the U.S. Chamber of Commerce, in an article just recently produced in "Nation's Business" has now come on board and seems to be recognizing the deterioration of the highway network and perhaps will be a willing ally and supporter of increased user fees in the days ahead.

We are a special interest group. Often in our States you hear the term, and we hear the term special interest group. There is no question that highway commissioners are especially interested in highways, because that is all we do. We take great pride, as I said earlier, in the system that is out there, and we are just delighted to see the support that has now been engendered throughout the country in recognition of what is happening and for some solutions.

Some 40 States have advanced user fees and have had them approved in the last 2½ years. One thing I like to say in a session like this is, we think the increase in user fees, where it characteristically used to be a real problem in the States—even increasing a penny was a great political liability—we don't think it is that kind of a liability anymore. I think, we have 40 States to prove it. We have State after State seeing that the public has supported those legislators that have supported a good highway system. If the legislatures of the various States are microcosms of Congress, if 40 States can do it, we don't think that the Congress is taking much of a risk if they go forward and through user fees keep the Nation's highways up to date.

The main problem, as I said earlier, Mr. Chairman, is that of equity. We think that transportation and good transportation is an absolute cornerstone of our growing and prosperous economy. If it is not to become a millstone, if I can use that term, action is needed at once. It was needed last year. It is needed even more today.

As far as the issues are concerned, that you asked us in your letter to address, the first issue is the matter of condition of the system and service life. As I said earlier, I think that has been more than adequately covered. You have all the numbers of the miles of highways and their condition and the number of bridges. I think, as I said in my earlier introduction, everyone agrees to those numbers.

We spoke to your committee last year, or some time earlier this year, about the same thing. We are happy to be back.

As far as the service life is concerned, I would like to direct you, Mr. Chairman, specifically to our testimony on pages 6 and 7. If I might, I might just read this into the record for the audience here present so that they are able to follow it.

Our general overall principal feeling is that service life of a highway is determined by several factors, including:

1. The quality of the original engineering design. Sound engineering principles need to be followed in the design and construction of a highway, and AASHTO has long been dedicated to helping assure this is common practice. Pavements must be properly designed, elevations correctly established, loadings properly analyzed, and so on.
2. The quality of the materials utilized in construction.
3. The quality of the workmanship employed.
4. The success of efforts to properly regulate highway usage, so that engineering limits are not exceeded.
5. The value of the axle loadings applied to the highway, considered together with the frequency of those loadings.

Generally, highways built over the last several decades have been properly designed and constructed to handle projected 20-year axle loadings and traffic frequency. Once constructed, a highway must also be properly maintained, and maintenance must be done in a timely manner if catastrophic events are to be avoided. Our States and local governments generally have established programs designed to properly maintain our highways, although resources for maintenance are today severely strained in much of America.

Given good design, construction and maintenance, a highway should last its intended service life. But that life is still finite, and usually a 20-year timespan is chosen by the engineer as the most reasonable cost-benefit goal.

The intended service life can be considerably shortened by increasing the intensity and frequency of the axle loadings placed upon the road. It is well established that axle load weight and the frequency of loading are the principal factors affecting how rapidly a highway will deteriorate.

Turning again to our system of interstate highways, these were designed for a normal 20-year life. However, in many instances our interstate highways are deteriorating at a rate faster than planned. This is occurring largely because axle weights have been increased above the design value, and because traffic volume is larger than anticipated.

Recently, the American Trucking Association produced studies attempting to show that environmental factors are the principal influence in highway deterioration and that increased loadings are much less a factor than is commonly argued by highway engineers. We understand that copies of those studies have been made available to the Congress, and thus we are submitting with this testimony a copy of our analysis of the studies. It is titled "A Review of Effects of Truck Weights on Pavement Deterioration" and "Causes of Pavement Damage on Interstate Highways," and was prepared by our Highway Subcommittee on Highway Transport, which is under Mr. Hunter, and approved in a ballot by our Standing Committee on Highways. The AASHTO report concludes that the two studies commissioned by the American Trucking Associations are not well founded and do not support their stated conclusions.

The next issue, Mr. Chairman, that you asked us to address was the needs versus revenues. I would refer you to our pages in our testimony of 8 through 11. I am not going to read those, but that pretty well outlines what has been said already. It acknowledges those States on page 10 that have submitted additional testimony to support that data.

Senator STAFFORD. Mr. Clements, unfortunately, we have now gone into another rollcall. I might as well tell our guests that we appear to be going into a filibuster on an abortion amendment and a prayer amendment in the Senate which may succeed in disrupting these hearings completely. But we will try to keep them going.

In view of that rollcall, I would like to ask a couple of questions right at this point before we find I don't have another chance to do it.

Mr. CLEMENTS. Fine. I would be happy to do that.

Senator STAFFORD. One is, I think all of you were in the room while Ms. Rivlin of the Congressional Budget Office was testifying and while Ray Barnhart, the Administrator of the Federal Highway Administration, was testifying. Am I correct in that?

Mr. CLEMENTS. That is correct.

Senator STAFFORD. My first question is, therefore, do you agree or disagree with their testimony in connection with the cost allocation study as to its fairness and equitability?

Mr. CLEMENTS. I think I would like to answer that question in this way. I will also defer to other people here at the table.

Senator STAFFORD. I am addressing that to all of you.

Mr. CLEMENTS. Obviously we have not taken a policy position vote on the highway cost allocation study. We got it in May. But, on the other hand, there are certain principles included therein, like the AASHTO road test, which we strongly stand behind, and the conclusions reached in that regard are certainly well founded, as I have said earlier. So, as a result, there is no question in our mind that heavier trucks, axle weights, and more frequent loadings are responsible for faster rates of deterioration. Therefore, those should somehow be factored into the cost allocation.

I think we say on page 13—I will read this quickly—that we support the concept of financing our highway program with user fees. User fees ought to be apportioned to the different user classes in a manner that is equitable and which reflects the costs imposed on the highway system by the class. The apportionment of user fees ought to be based on sound, recognized engineering principles that take into account axle weights and frequency of loading, so that all user classes are treated equitably. Specific user fees ought to be designed in a manner such that they can be economically and fully collected, with a minimum of administrative cost.

Senator STAFFORD. Is there any divergence of view in the panel from those statements?

Mr. HUNTER. I think, too, we could say we support the graduated fees. We think the AASHTO road test supports that. This is how we handle things in Missouri. We think it is logical and reasonable.

Senator STAFFORD. Thank you very much, gentlemen. I think that is important for people to know.

Then, Mr. Clements, in your statement you referred to maintenance must be done in a timely manner if catastrophes are to be avoided. Can you expand on what catastrophic events may occur if we don't act in a timely manner?

Mr. CLEMENTS. I would like to defer that to Mr. King, I think, so we are not hearing from just one voice.

Senator STAFFORD. All right. That would be fine. That doesn't make him a catastrophic event, does it?

Mr. CLEMENTS. No, not at all.

Mr. KING. I don't have anything in my testimony about that, but I guess I can say that in evaluating some of our problems in Virginia on highways that look like they are at the present time in good usable condition. When we study them a little further and take some of the borings on those, we find that they will need to be reconstructed completely in a very short time unless we can get the attention of resurfacing and building up the stability of those highways. Also in Virginia we have 1,240-some-odd bridges listed in my testimony, on the Federal aid system in Virginia that need attention. They are structurally deficient in some manner and down to 2 percent based on a 100 category in load carrying capacity. So the needs are great.

Senator STAFFORD. If a traveled portion of the interstate; for example, is allowed to go well beyond the design life and there is severe deterioration of the travel surface, does that mean that it is likely the whole roadbed would have to be rebuilt?

Mr. CLEMENTS. I think traditionally, if we had the curve to show you—perhaps you have seen it in the past, for the first 15 years of the design life, it is pretty serviceable. Then we fall into an area that is called fair to poor serviceability rating in which the curve drops almost vertically. So for the next 2 to 3 years every dollar spent in the early part of those for regular routine maintenance and resurfacing, you have to go in and spend $4 to $5 just 1 or 2 years later. If it goes to total failure, then you are talking about total reconstruction and talking about a figure of $10 to $15. So we think it is really fiscally irresponsible not to address those maintenance needs early on, so we don't fall into the condition of the railroads.

Mr. HUNTER. I don't think there is any question the evidence is out there right now, because we have not been able to resurface those pavements at the rate we know we ought to from experience. It has meant in our State, and I am sure a lot of them, a tremendous increase in the amount of pavement patching. That has been going up on the curve. That pavement patching is nice, if it can be done completely satisfactorily under traffic. It cannot always be done. It rides rough. It continues to increase the impact from loads and further deterioration of the pavement. It is going to accelerate that. We think it is going to take three to seven times as much money to put it back in shape.

Mr. **Kemp**. In Kansas, 32.5 percent are in need of immediate attention and within 4 years 60 percent of those surfaces must have attention. Deferred maintenance becomes reconstruction.

Senator **Stafford**. Thank you all very much. I am going to have to recess this hearing for 10 minutes and hope I can get the subcommittee chairman, myself, or Senator Bentsen back here. We will stand in recess for 10 minutes.

[Brief recess.]

Senator **Symms** [presiding]. We apparently are going to have a series of votes on the floor.

I thought you were through testifying?

Mr. **Clements**. Not quite.

Senator **Symms**. Well, I apologize that I missed your testimony. I will carefully read over your statement. So if you want to wrap your statement up, please do so.

I would just like to say, it is the Chair's intention to stay at these hearings until we get through. We have 11 witnesses. So if you could all limit yourselves to 5 minutes each, we could be done in approximately an hour, minus time out for votes. I probably won't be lucky enough to get any other Senators back to the meeting, so we won't be able to continue except when I am here. But if you are not finished, please go ahead.

Mr. **Clements**. I just have a few additional items and then I would like to defer to my colleagues so they could cover the statements they brought with them, Mr. Chairman.

I certainly understand, and having heard your statement earlier, and I said earlier in our testimony that I don't think you or any of the members of the committee need much education on highway needs. I have heard you speak in the past and your eloquent statement before the previous speaker stepped away from the microphone gives us all I think great encouragement that you understand what the needs are and are interested in an equitable disbursement of revenues when they come.

Senator **Symms**. Thank you.

Mr. **Clements**. One of the things that disturbs the States greatly is the obligational control situation that is now going on. It is virtually emasculating the States ability to perform the task it is assigned.

One of the strong points in our program that has always been admired, I think by other programs, is that we have had a predictable source of revenues and long periods of time to construct the system. What obligational controls are now doing to us is making that time and planning cycle almost nonexistent.

The resultant failures of construction industries in recent months gives us great concerns that if revenues aren't raised in a hurry, competition will be severely affected. We feel that that is a trend that should be reversed right away.

I might, Mr. Chairman, just state that, as I said to Senator Stafford earlier, in our testimony, we generally recite, and I won't go over them again here, what we think the allocation formula should include. I think that if we were to take a vote in AASHTO, that we certainly wouldn't favor alternative II as shown in your handout that you mailed out to us. It would probably more closely reflect I and II, but it is really too early to say. There is great divergence among the States. But we would certainly think allocation should be on a consumption or use basis. We would strongly support the FHWA statement in that regard.

The ATA position is often said by a couple of people, including your own commissioner, our secretary in Idaho, that if environment is such a factor, how is it that it only snows on the right-hand lane? As most of you know, Arkansas and Louisiana in recent weeks have encouraged truckers to drive on the left-hand side of the road to equalize pavement wear and thereby get more useful life out of the highway system.

I just don't think there is any authoritative data we can show, other than that included in the general provisions of the study, that would indicate that there isn't a direct relationship between axle load and frequency. ATA in their study seems to put a lot of emphasis on weight, but they said nothing about frequency. The frequency of pavement distress and pavement wear is one of the most important factors in pavement deterioration. If highways in the country are wearing out sooner, it is not because they were misdesigned or inappropriately constructed. It is because there is more traffic frequency and more heavy loading frequency than the engineer anticipated. So, therefore, we believe in that direct correlation.

I think again, to quote your own secretary, who will be speaking to you when you are in Idaho at the hearings—I talked with him last week—that he believes that the Interstate System basically created the trucking industry as we know it in the country today. It is an entirely different common carrier industry than existed before the Interstate System came into existence. I am glad to hear them say that they are interested in paying their fair share of it because basically it has really created their business and they have a legitimate and reasonable cost that they should pay.

I am sure people of reasonable persuasions can be brought together sometime between now and the Drew Lewis advancement to work out those difficulties.

I think with that, Mr. Chairman, I would also like to say that if your staff will refer back to the AGC presentation last week on page 9, you will note there a summary of what they think the solution is. I would like to say for the record that we had a joint committee meeting of AGC, AASHTO, and ARTBA 2 weeks ago in St. Louis. That joint committee ratified all of the six points included on page 9 of their testimony: $13 billion per year needed, equivalent doubling of highway user fee; cash balance in the trust fund to be expeditiously reduced to $2 to $3 billion; the imposition of obligational controls will be discontinued; the highway trust fund to be extended for an indefinite period of time; and all types of energy-propelled vehicles to be subject to user fees; and of course last, but not least, proper allocation of those expenses.

With that, Mr. Chairman, and in the interest of time, I would like to defer to my colleagues or answer any questions you might have.

Senator SYMMS. Thank you very much.

Do each of your colleagues have statements?

Mr. CLEMENTS. Yes.

Senator SYMMS. Mr. Hunter?

I might say your entire statements will be made a part of the record. I am going to put a timeclock up here. We will try to expedite the hearings. I know there may be some who have to catch airplanes.

STATEMENT OF ROBERT N. HUNTER

Mr. HUNTER. Mr. Clements has covered a lot of ground here.

I think we have to realize, Senator, as I am sure you have, after reading your opening statement to this committee, that you have a good knowledge of this. But the facts are even in the good times, in our State, and I am sure it must be so in many States, when we were making what we thought were reasonable improvements to the system. When you look at the annual record, we were only improving from 1 to 3 percent of the mileage of the system. So 97 to 99 percent of that system got no attention other than maintenance; it got no improvement. We are simply not keeping up to date with the resurfacing that is necessary, the rehabilitation of those pavements, and the bridge repair.

In our State, for instance, we are presently replacing about 15 bridges per year. Looking at a proposed 60-year life, we should be replacing 100 bridges a year. In addition a similar number ought to be redecked each year. So this is an indication of how far behind we are actually falling with this.

The problem, of course, is that inflation is a big factor. But another thing is due to the ingenious auto manufacturers. And certainly we salute their efforts. We are all driving more fuel-efficient cars, so less fuel is being consumed, therefore less money is coming into all of our road funds. At the same time, vehicle travel is going up. Traffic has increased in Missouri in the last 10 years by 32 percent. So those axle load applications are occurring on some antiquated pavements and some relatively new pavements. But it is a big problem. So we know we must do something to take care of that pavement surface and those bridges or we are going to be in very, very serious shape.

In looking at some of the things that have gotten us in the predicament we are in, one, of course, is the many procedural requirements. Additional programs have been imposed on the highway program in the last decade or two. These include environmental considerations, social program considerations, and many others, all of which certainly are worthy. The big problem is that those additional requirements were imposed on our roadbuilding program with no additional funds. So these have resulted in a considerable cost, and all of these have resulted in considerable additional cost.

As you know, the Federal tax has not been increased since 1959. As we have attempted to accomplish the necessary ongoing road improvements and take care of all of these additional requirements, very expensive requirements, with essentially a fixed level of funding, through a very inflationary period, you can see that a considerable backlog of work has really developed.

Further delay of these badly needed improvements in our opinion is going to result in an accelerated deterioration of the system. Should this happen, we feel it is going to take three to seven times as much money to place this back in shape.

We have taken a look at what we consider to be just the basic critical needs on our State system. We have 10,000 bridges. We have determined that between 700 and 800 of those ought to have major repair or replacement within a 10-year period. We have looked at the most serious congestion problems, capacity problems, where we are experiencing 200 percent capacity at the present time: The safety improvements, high hazard locations, roadside obstacle type improvements, and those types of things, and of course the resurfacing necessary to maintain the integrity of roadability on those pavements.

These studies indicate to us to take care of those basic critical needs we are going to require three times as much money as we are presently receiving. I think this is pretty indicative of the situation that exists pretty well throughout the country.

I think that we all agree with you that there definitely is a need for increased funding. We just must do this today. To do otherwise is really going to exacerbate the problem. We are going to be talking about a lot more money in the future.

Senator SYMMS. Thank you very much for your testimony.

I might just ask you one brief question. I understand that the referendum in Missouri was voted down. Is that correct?

Mr. HUNTER. On trucks?

Senator SYMMS. On truck weights.

Mr. HUNTER. Yes, sir.

Senator SYMMS. So you are still at 73,000 pounds.

Mr. HUNTER. Yes, sir.

Senator SYMMS. Is there any possibility that Missouri will ever get that in line with the rest of the country at 80,000 pounds?

Mr. HUNTER. I think we will. We supported it. The Governor supported it.

Senator SYMMS. I appreciate that you have. I think most of us do.

Mr. HUNTER. It didn't fail by that much of a majority.

Senator SYMMS. The argument about trucks damaging the highways is a little bit academic between 73,000 and 80,000 pounds. It is certainly costly to the rest of the country if we don't get 80,000 pounds.

Mr. HUNTER. Our truckers have agreed to an increased fee, Senator, to offset that. That was part of it. So we thought it was reasonable.

Senator SYMMS. So you think it is possible we can hope to get a load of potatoes across Missouri from Idaho without unloading 80 sacks.

Mr. HUNTER. Hopefully not any more like one load in southwest Missouri that was over 10,000 pounds.

Senator SYMMS. That certainly wasn't from Idaho.

Next is Mr. Harold King, secretary of the Virginia Department of Highways and Transportation.

STATEMENT OF HAROLD C. KING

Mr. King. Mr. Chairman, I will clarify. I am commissioner of highways in the Virginia Department of Highways and Transportation.

I am going to just make some brief remarks, since you have our testimony, about needs. I would like to have Mr. William Landsidle, who is sitting behind me, address the cost allocation part. He will have some comments there. Mr. Landsidle is deputy secretary of transportation. He was also instrumental in working on the Virginia cost allocation study in the joint audit legislative committee.

Brief comments on needs. Our needs are particularly pronounced, as I indicated in my testimony, in the interstate and primary and bridges. I will just say that in the interstate we get about $120 million a year in Virginia; yet our most recent estimate to complete the Interstate System is $1.5 billion. So you can see the needs are there.

In the Federal bridge replacement area, we have 1,240 bridges on our Federal-aid system that are functionally obsolete and structurally deficient. It needs hundreds of millions of dollars to correct those. Our present bridge replacement funding will not come near handling that need.

One other area that I would like to bring to your attention is something Mr. Clements alluded to, and that is the obligational authority. That is a serious concern of ours in Virginia.

This year we passed legislation giving us additional funding. If we hadn't we would have been out of the construction business by 1984. We would have lost $900-plus million in Federal-aid funding because we would not have been able to match those dollars.

The legislature courageously responded. We developed not what we identified as the critical improvement program, but we came up with a 6-year program. It is about 62 percent of what we identified as a critical improvement program.

The legislature and the people and the citizens are looking for us to produce that 6-year program on time. In there we have cranked in the Federal-aid funding. At the present time, because of our reduction from authorization to obligation authority, we have approximately $60 million worth of work that could be advertised and contractors' bids in September if the obligation authority was available. So that is an important thing.

I guess primarily, No. 1, we need a highway bill.

Senator Symms. Thank you very much.

Mr. Landsidle. Mr. Chairman, I just wanted to make the point that I am speaking in a little different vein than the commissioner or the other commissioners. I am talking to Virginia's policy with regard to highway financing based on the cost allocation study completed last year. AASHTO has not taken a formal position on the cost allocation study. I don't want those two points to be confused.

As you may know, in Virginia we did complete a cost allocation study over the last several years. It took 2 years to develop.

The Virginia and Federal cost studies followed similar methodologies in allocating costs among vehicle classes. For example, in the important and controversial area of pavement cost allocation, we adopted the methodology originally proposed by the Congressional Budget Office and later incorporated in the section 506 study.

Not surprisingly, the results of the two cost allocations are essentially the same. This is the point I want to make. There are a number of instances we have heard because Virginia's bottom line finding was heavy trucks were paying their way in Virginia for fiscal year 1980, that somehow it has been suggested that that invalidates or raises questions about the Federal cost allocation study. We do not view it that way.

Virginia assigned 63.9 percent of highway costs to autos and light trucks, while the Federal study assigned 64.7 percent to those vehicles. Combination trucks were assigned 26.1 percent and 27.4 percent respectively, while all trucks, treated as a class, were assigned 37.8 percent of highway costs by Virginia and 34.8 percent by the Federal study.

In our technical review in the design of the study we determined that because of the various uncertainties and data limitations inherent in anything as complex as the cost responsibility analysis, we were going to have to assume that there was some uncontrolled area. We set our error range, somewhat arbitrarily, but reasonably, at 3 percent. Since the Virginia and section 506 cost allocations vary by no more than 3 percent in any of the comparable categories of analysis, and are within 1.5 percent of each other with regard to the classes which include autos and heavy trucks, we have concluded that there is no substantive difference between the Federal and Virginia findings as they relate to costs in the two major uses of our highways.

While the cost allocation of the two studies were comparable, the assessments of revenue adequacy were somewhat different. The section 506 study completed by U.S. DOT projected for the Federal highway trust fund that by 1985 autos would slightly underpay their cost responsibility, single-unit trucks would overpay by almost 100 percent, while tractor-trailers as a class would underpay their assigned responsibility by 20 percent. Virginia's projections for 1984, which is our design year, under one typical budget scenario, found all classes underpaying: autos and tractor-trailers by 11 percent and 12.5 percent respectively, while single-unit trucks were found to be a major problem area with underpayments of 30 percent or more.

The relatively better showing of the larger truck classes in the Virginia study, compared to the section 506 analysis, we believe is due to the nature of our tax structure and how it differs from the Federal tax structure. A 2-cent-per-gallon surcharge on motor fuel used by heavy trucks is imposed in Virginia. We receive proportionate registration fees from a number of other States and a weight-graduated registration schedule, which all combine to bring heavy truck taxation in Virginia more closely in line with assigned costs than is apparently the case with the Federal tax structure. Conversely, the fact that in Virginia most single-unit trucks are exempt from the 2 cent surcharge and enjoyed significantly lower registration assessments contributed to the serious underpayment by those vehicles.

In response to these findings, as Commissioner King noted, the General Assembly passed a comprehensive highway tax bill in March of this year. General revenue enhancements were sought through an oil franchise tax, as well as across-the-board increases in motor vehicle fees and registration assessments. The registration fee schedule was adjusted to address the underpayment problem with single-unit trucks. The tax bill, which will increase user charges in Virginia by as much as 26 percent across the board, will itself be subject to an additional followup cost responsibility evaluation later in the decade.

In summary, Mr. Chairman, I suggest that our recent experience might raise several questions for this subcommittee.

One is the allocation of costs in the section 506 study appears to have been done in a reasonable fashion and is supported by the results of Virginia's independently conducted research in this area.

Two, that the substantial underpayment of cost responsibility assigned to combination trucks by the Federal study indicates that Congress should look closely at revenue proposals which better reflect the cost/revenue balance than does the existing tax structure. Therefore, proposals to simply raise the Federal motor fuel tax across the board would seem to seriously underutilize the section 506 study results. Some combination of a fuel tax differential, possibly combined with a weight-graduated use tax, would seem to provide a mechanism, similar to those employed at the State level, to address the equity issues raised by the section 506 study.

In closing, Mr. Chairman, I would reiterate the point made at the beginning of our testimony. While we are philosophically interested in the application of equity criteria to any change in Federal highway use taxes, our primary concern remains the adequacy of Federal revenues and the manner in which any turnback initiatives are carried out. We stand ready to assume full responsibility for the 52,000 miles of secondary roads and urban streets in our State system. We can only make this commitment, however, if there is adequate Federal support to provide for completion and necessary rehabilitation of the interstate system, as well as support for a reasonable joint Federal-State program of construction, rehabilitation and bridge replacement on those primary and urban routes of interregional and interstate significance.

Thank you, Mr. Chairman.

Senator SYMMS. Thank you very much.

Next is Mr. John Kemp.

STATEMENT OF JOHN C. KEMP

Mr. KEMP. Thank you, Mr. Chairman. I am John Kemp, secretary of the Kansas Department of Transportation. You have invited me to testify today concerning the condition and needs of the Federal-aid highway system. I would like to address those issues from the perspective of one State. That is Kansas.

I will not belabor the point of needs. I will make a couple of quick references.

Our current needs for our 821-mile Interstate System are $230 million for gap closing and $420 million for the 4R work. At the present rate of Federal funding and with no inflation—and I stress no inflation—it would take us between 9 and 10 years to complete the gaps and more than 40 years for the backlog of 4R needs. That doesn't count the sections of roadway that develop new needs in the next 40 years.

We have about 25,000 bridges on our 135,000-mile system in the State total, and one out of three of these is deficient with respect to the Federal safety standards. The average age of the 4,600 bridges on our State highway system is 30 years. We are currently replacing about 20 a year. At that rate, it would be 230 years before that bridge would be replaced again. Senator, I can assure you bridges do not last 230 years.

Kansas supports the principle that highway users should pay for highways. We know that additional revenues are needed at the Federal level, just as they are needed at the State level. We believe that the method for raising that additional revenue is a matter for determination by the Congress and by the President. Kansas takes no stand on how additional revenue should be raised.

We are about to embark on a highway cost allocation study in Kansas. We are aware of the desires of the various interest groups as to the methodologies to be applied. We will carefully review all of these alternate methodologies. We have made no decision at this time in this regard.

Kansas believes that all highway user taxes paid into the Highway Trust Fund should be used only for funding highways. While it is clear that transit authorities are in need of additional funding, we do not believe it proper to fund mass transit programs from the highway fund. If the logic for such funding is that mass transit can reduce the need for highway facilities or for the preservation of them, then a similar case can be made for funding air, water, and rail transportation from the highway trust fund as well.

It is Kansas' position that should the Congress in its wisdom determine that highway user revenues are appropriate for funding mass transportation programs, we would then suggest that such funding be allocated to the States in accordance with highway fund categories. Rather than to allocate $1 billion for mass transit programs, we believe it would be preferable to increase the secondary and urban apportionments by $1 billion and to permit the local units of government to use some of the secondary and urban funds for transit programs.

While this would violate the principle of highway funding for highway purposes only, it would at least recognize the principle of local determination.

It is a reality that since the mid to late seventies, the cost of highways has skyrocketed while the purchasing power of static or declining revenues has plummeted. This was caused by forces beyond the control of either the Federal or State Governments. The resultant loss of highway plant preservation and improvement will be difficult to overcome, but overcome it we must.

Many of the States have been or are in the process of making the hard decisions that go with providing additional revenues. We think it is time for our Federal partner to join us, perhaps even to point the way, for the support of a network of highways that is so vital to the economy of our Nation and that of each of its States.

Mr. Chairman, that is a summary of my statement that I have submitted. I would appreciate its inclusion in the record.

Senator SYMMS. Thank you very much.

All of your statements will be included in the record. I appreciate the diligent efforts on all of your parts in supporting those of us here who are trying to make a case to our colleagues on the necessity that we expand our potential here to lead the way as far as the road system is concerned.

I just have one more question. I know Mr. Stafford asked several questions.

Did I understand you correctly that in the State of Virginia you have more State funds than the Federal Government has to match you? Did I understand it right?

Mr. LANDSIDLE. I am not sure I understand. We have 100 percent State funding in addition to what we have to match Federal aid.

Mr. CLEMENTS. Mr. Chairman, if I could address that, I think that is a common situation in the 40 States that have raised local-State revenues against match. The 1978 act apportioned funds to the States. All States then raised their matching shares, as the legislatures have met. So we have matched the funds against apportionments.

I think the danger that occurs in many States is that many States are now hanging out with matches set aside for Federal funds that were apportioned but now no obligational authority is available. So I think the danger is our local legislatures are going to say where are the Federal programs that you testified to that you said you would build for us? We voted them the Federal-local match. Where are they? There will be real disenchantment. What will happen I think is disenchantment of the State keeping up their part of the share.

Senator SYMMS. Thank you very much. We will probably have some more questions we may want to submit. Probably we will do it through the association, so they will be directed to your association.

Mr. CLEMENTS. Thank you, Mr. Chairman. As I said earlier, you will see delegations I think on your western tour from the States that will add more to the testimony.

Senator SYMMS. I apologize we can't go into this further, but I know we have people here that have come from out of town. We would like to be sure we get them up here to testify also. Gentlemen, thank you.

Mr. HUNTER. We certainly thank you for your efforts.

Senator SYMMS. If the next panel would please come forward: Mr. A. G. Lichtenstein, Mr. Kenneth Heald, Dr. Matthew Witczak, and Dr. David Schelling.

Gentlemen, the first witness I guess will be Mr. Lichtenstein. Your statements in their entirety will be made a part of the record. We would appreciate your summarizing them if possible.

Mr. Lichtenstein.

STATEMENTS OF A. G. LICHTENSTEIN, PRESIDENT, A. G. LICHTENSTEIN & ASSOCIATES, INC.; KENNETH HEALD, HIGHWAY RESEARCH ENGINEER, WESTERN HIGHWAY INSTITUTE; MATTHEW WITCZAK, PROFESSOR AND CHAIRMAN, DEPARTMENT OF CIVIL ENGINEERING, UNIVERSITY OF MARYLAND; AND DAVID SCHELLING, DEPARTMENT OF CIVIL ENGINEERING, UNIVERSITY OF MARYLAND

Mr. LICHTENSTEIN. Thank you, Mr. Chairman. I am deeply honored to be here. I am a private consultant from New Jersey. I feel that you people take time to listen to me. I am quite pleased with that.

I do not represent any organizations, any societies, any universities. I am a private practitioner. But I do represent 2,000 to 3,000 bridges that my company has attended to to solve problems in the last 20 years. Therefore, having heard Mr. Barnhart this morning and these distinguished highway officials, I feel I will do my testimony on the off-system bridges. So my comments will be directed in that direction.

The philosophy we have developed is that we have a big national resource in these old bridges which we have a great tendency to throw away. Our philosophy is we ought to rehabilitate them first and throw away second.

I heard the statement this morning that a bridge is only good for 50 years. That is not true. I don't believe that is correct. I think a bridge lasts a lot longer. I am right now working on a bridge that is 135 years old, 101 years old, many bridges 60 to 80 years old. We ought to make a concerted effort to upgrade them structurally, sometimes widen them.

What I am saying is we have to do this on a pragmatic, per case method. We shouldn't make any paintbrush sweep to replace bridges or not. Our experience has shown out of 10 inadequate bridges, at least 5 of them can be economically upgraded.

While we are doing all of this, we can also then probably restore a lot of our historic bridges, which is another subject that I would very much like to discuss with you at greater length, but I don't think time would permit, but it is in my statement. I would like you to pay some heed to it, if you will.

You would be surprised at the amount of interest that the general public has been paying to their bridges over the last 10 years. Time after time we attend meetings with local citizens who want to replace a small bridge, something that is important to them. I was in New Hampshire, Mr. Clements' State, Monday night. We just had a night meeting on a 100-foot bridge which is very important to the town, how they want to upgrade it. That happens in Connecticut, in Minnesota. They are bridges that people are concerned about. I think they look toward their elected officials to try to help them restore it.

To restore a bridge for museum purposes is not the idea. The idea is to restore them so they can be used and be a part of the system. I think that is one resource we must, with Federal help, keep working at.

I have some general statements here that I made on design and maintenance. I think I am going to let the record speak for itself.

All I can say about maintenance is I think there is no such animal as deferred maintenance. I think we have to maintain new bridges and all bridges. It is very possible these old bridges that appeal to me, they have the weight capacity but they don't have the frequency that the State and interstate highways have. Therefore, I think they have a lot of strength left in them which we could utilize.

As far as improvement in construction material, I think the AASHTO people are doing a terrific job. They spend a lot of money on research. We get all of these new details, new fatigue regulations. I am very pleased.

I would suggest as far as light load is concerned, for new bridges and upgraded bridges, that we use the 36 ton plus 10 percent, which is about what you were talking about. It gets you to around the 80,000-pound vehicle. If you spread that vehicle further out you will get bridges to the same type of capacity. You may see silhouette signs in some of the States with a picture of the truck with a loading. We developed this for many counties. They are using this again to get the lower weight truck over the bridge without too much destruction.

One other area that I would like to bring up that was mentioned by one of the State commissioners is the environment We don't want to do anything with our bridges to upset the environment. But why must we go through local and State and Federal regulations? It takes years and years to get a permit to replace a bridge. I think it is a lot easier to reconstruct it. There is a great advantage in the reconstruction of a bridge, that we cut our permit time substantially. So there again I know the tendency lately has been to reduce the red tape. I congratulate you and all of these commissioners for doing so. But I think we have to keep on doing that because of the costs we incur with permits.

I am just going to make one more comment and then I will quit because I see the sand has gotten down to the bottom of the ocean there. I think the counties and the governments that have bridges that are inadequate and decide to put a little seed money up front and they make studies and they decide about upgrading or replacement, by the time they come to the Federal Government or to the State, they should know what they have. They have to put a little money up front. I think that entities ought to be given a little star or brownie point or something so that when they do go after the Federal-aid projects of a larger magnitude, they should be compensated for the fact they weren't sitting there waiting for somebody to do everything for them.

I think the rest is all in my statement.

Senator SYMMS. Thank you very much.

I looked through your entire prepared statement, which will be part of our record. Do you believe that the State highway engineers and Federal highway engineers, because of the nature of the bureaucracy, tend more to want to replace the bridge than to repair it?

Mr. LICHTENSTEIN. I think it is easier for them to do so, because you have heard the statement in 230 years he is going to need new bridges again. The point is, with the proper maintenance and proper design and proper control, yes, we could keep those bridges in service a lot longer. I think the tendency has been a lot stronger than in the last 5 to 6 years. Now they have started to look into rehabilitation as a tool.

Senator **Symms**. Thank you very much. That was a very excellent statement. We appreciate having that in our record.

Now we will hear from Mr. Kenneth Heald.

STATEMENT OF KENNETH HEALD

Mr. **Heald**. Senator Symms and staff persons: My name is Kenneth Heald. I am a highway research engineer and acting chief engineer of the Western Highway Institute. I thank you for the invitation to testify today on the Federal highway cost allocation study.

Western Highway Institute has been studying highway cost allocation and other highway transport issues since 1947. Our research efforts have been focused primarily on the Western United States and Canada, although WHI has also served as a Federal subcontractor on several major vehicular research studies. WHI is supported by the dues of motor carriers, vehicle manufacturers and suppliers of services to the highway transport sector, but we serve only as a technical research group with neither a policymaking nor a lobbying role.

WHI has testified and contributed to the truck size and weight study and last year testified before this same subcommittee on the highway program at the hearing in Boise, Idaho. Today I will speak only on highway cost allocation.

I would like to summarize quickly for you the eight points in my full written statement which was filed earlier for inclusion in the record.

Point 1, the 1982 Federal cost allocation study undertook and completed some badly needed elements of basic research. Some outstanding strides have apparently been made in the methodology used to translate user group cost responsibilities into predictable cost recovery mechanisms; that is, taxes. Another positive note is the initiation of a long overdue nationwide data collection effort which could ultimately help define the real-world cause-and-effect relationships of pavement service life. These things aside, the Federal study represents a radical philosophical departure from previously accepted relationships between the costs associated with providing highway facilities and the vehicular characteristics which occasion those costs.

Point 2, one of the most critical elements of the national highway program is the provision and preservation of adequate pavement surfaces. The Federal report indicates that some 44 percent of the anticipated Federal capital expenditures should involve reconstructed pavements. The subject of user group cost attribution associated with reconstructed pavements, in particular, is perhaps paramount among the most controversial issues raised by this new study.

Point 3, the focal point of the pavement cost attribution issue is the practical utility of the AASHO road test load-effect relationships. Our written testimony indicates that the road test findings are widely accepted and used for pavement design purposes. It also shows that pavement design is not a precise science but, rather, an art—an evolutionary process built on empirical techniques plus engineering experience and judgment.

The staff of the Highway Research Board put this issue in proper perspective by stating in one of their reports, "The relationship between traffic loadings and structural components of conventional pavements developed during the AASHO road test have provided useful tools for improvement of empirical design procedures."

Point 4, while the AASHO weight only relationships are widely recognized, used, and quoted there is no broad-base experiential data which can be used to correlate actual mixed-traffic, pavement-life experience with the wear-out predictions based on the AASHO equivalents. Yet these theoretical predictions are the ultimate basis of the pavement wear functions used in the new Federal procedures dealing with reconstructed pavements. In fact, this glaring data deficiency is the primary justification cited for attempting the development of a uniform, nationwide, long-term pavement monitoring program.

Point 5, there is no basis to accept the 1982 study contention that the attribution of reconstruction costs should be handled differently than are new construction costs. The ultimate goal of new construction, reconstruction, and resurfacing is to create or restore a high level of serviceability for some anticipated period of service-life expectancy. While the procedures and costs may vary, there is no practical rational basis for the assumption that there must be a variation in the methodology used to determine cost responsibility shares between new construction, reconstruction and resurfacing.

Point 6, differences in cost allocation methodology can and do produce extreme variations in user-group cost responsibility determinations. The 1982 study very effectively demonstrates this point. Exhibit 10 in my full presentation shows that a nearly 30 percent shift in responsibility between passenger cars and trucks is the direct result of the use of the new cost allocation methodology. Yet there is no real-life experience or broad-based data which support the validity of the new concepts.

As stated in the report itself, and I quote, "Despite the many highway pavements built during the past 20 years, there are simply not enough monitored sections with adequate traffic data to conclusively verify the mechanistic pavement behavior theory that was relied upon in the development of the pavement distress models used in this cost allocation study."

Point 7, is conclusionary. It indicates there is no technically justifiable rationale for adopting a new, untested philosophy rather than relying on an improved, technically sound, design-based procedure. The text of the 1982 study notes that "Cost assignments are reported and compared first for the two principal and feasible allocation approaches, the recommended and updated incremental approaches"; nevertheless, all user charge taxation alternatives presented in the 1982 study is based solely and only on the new recommended philosophy.

The final point summarizes and includes our resulting recommendation. The quantitative significance of the changes in taxation share resulting from the recommended approach to cost alloation are too drastic to be accepted without a more substantial basis in research validation. It is our recommendation that the subcommittee request and examine tax recovery mechanisms and tax rates based on the results of an incremental analysis before any far-reaching, long-term changes are translated into new Federal legislation.

I would be pleased to answer any questions about my testimony.

Senator SYMMS. Thank you very much.

I think we may have some questions we will want to submit to you in writing. It is very interesting testimony.

Dr. Matthew Witczak.

STATEMENT OF MATTHEW WITCZAK

Mr. WITCZAK. Thank you, Senator.

First of all, it is a pleasure to be here. Since I was asked to appear here just several days ago, I have not prepared a written formal statement. However, I would like to highlight several ideas in my opinion relative to pavement design.

I come here today primarily as an educator, researcher, and consultant primarily in the pavement design field. I have served as consultant to numerous agencies: The FHWA, National Academy of Sciences, all the branches of the military, and most notably served as the chief consultant to the Corps of Engineers on the MX land-based scenario. I feel I have a fair degree of knowledge in pavement design, distress and performance, materials, and load equivalencies. As a result, I would like to briefly address my thoughts and opinions on the technical contents of these problems.

First of all, relative to damage factors or load equivalencies, I think you have heard much discussion in the subcommittee, about the validity of the AASHTO damage factors. It is my strong opinion that they are right now probably the best and most widely accepted form of damage equivalency values not only in the United States but probably on an international basis as well. Even though there are loopholes and they may not represent the precise state of technology it really is the best we have to offer the community at the moment.

I know there has been much discussion relative to the environment and environmental issues. I would like to just briefly give you my opinions on how they would relate to cost allocation.

First of all, there are very few pure environmental effects upon highway pavement systems. Most of the influence of the environment is a complex interaction with load. While most of the damage basically is load associated, I think we can combine any environmental effects, or most of the environmental effects, directly into the design of the pavement and analysis of equivalent factors. I think this is very important. The main effect of environment is upon altering material properties. The significant factor or the significant result is that even though materials may vary, the relative damage caused by different axle loads or different weights will remain the same, irrespective of the material response. So when I hear arguments to the effect that environment is a very significant factor relative to the damage factors, I am not of the opinion that is a true statement.

Relative to failure or distress mechanisms, and again I think I can speak with a fair degree of validity from an international viewpoint as well as the United States—almost all of the design procedures can be based upon either structural or what we would call functional designs. The functional design is primarily a user-oriented AASHTO type of design. Again, it has been my experience and my opinion that this type of design approach has gained a tremendous amount of credibility all over the world. So the results have not only been widely accepted in the United States, but I think by many foreign design agencies as well.

I would point out that the idea of serviceability is primarily related to a user opinion. But again, these opinions, which are subjective, have been related to road roughness, cracking and patching, and rut depth, which again are all load and environmentally related.

So, in summary, I would just like to say that I personally would support the AASHTO design concept, and the use of the AASHTO load damage factors. I feel that the majority of damage is primarily due to load associated mechanisms. I do not want to say that the environmental considerations are not important; they are. Relative to the use of cost allocation between the incremental method and the FHWA idea of consumption or equivalent damage, I think the FHWA approach is probably the best and fairest procedure that we have that technology can supply to the public today.

Thank you.

Senator SYMMS. Thank you very much.

Just one question. How do you answer the question that often comes up and the statements that some people make that the highways that don't allow any truck traffic at all seem to wear out about as fast as those that do? What is the answer to that?

Mr. WITCZAK. I don't think that is a true general statement. There are cases, for example, where this occurred, such as in California, and probably most notably locally the Baltimore-Washington Parkway. I believe these examples are anomalies in the situation or in the field of pavement performance rather than being typical of the type of distress and performance functions that we would have.

Senator SYMMS. Anomalies in pavement performance in what respect?

Mr. WITCZAK. I think Mr. Barnhart indicated previously, there are many factors other than load that have to be considered. He indicated the quality of the engineering design, materials of construction are other factors that must be evaluated and considered. In reality, any pavement will become severely distressed if all factors are not adequately evaluated in the design phase. I think what you are looking at with the Baltimore-Washington Parkway is primarily a classical case of material incompatibility with the environment. There are nonload associated distresses occurring but proper engineering in the design phase could have eliminated this problem. Thus, one couldn't make a general statement that this is atypical of all the highways in the country.

Senator SYMMS. Thank you.

Mr. Schelling.

STATEMENT OF DAVID R. SCHELLING

Mr. SCHELLING. My testimony pertains to cost allocation methodology and the effects of vehicular weight limits on bridge structures.

The Maryland highway cost allocation study was intended to evaluate the equity of current State highway user tax payments among the users of Maryland highways, roads, streets, and bridge structures. The study, completed in February 1982, utilizes both the traditional incremental method and the new Federal primary method which parallels the national study just completed by the Federal Highway Administration. The following pertains to the status and results of the study:

First. The Maryland study encompassed both the incremental and the new Federal primary methods in order to provide policymakers with a range of options.

Second. The Maryland study was the first to utilize the new Federal primary method and has benefited from substantial liaison with members of the Federal Highway Administration, the Congressional Budget Office, and the Maryland Department of Transportation. It is felt that the methodology incorporated within the report pertaining to the new Federal primary method yields results consistent with that specified in the latest version of the Federal highway report.

Third. The Maryland study utilized actual and projected highway expenditures over a relatively large base period of 6 years, 1979 to 1984.

For Maryland, the following major findings are given:

Automobiles currently pay their share using the incremental method but are significantly overpaying using the Federal primary method.

Pickups and vans currently pay almost their share using the incremental method but overpay using the Federal primary method.

Single-unit trucks are generally shown to be overpaying using the incremental method and significantly underpaying using the Federal primary method. This disparity is particularly large for the dump truck under the Federal primary method.

Truck-tractors are significantly underpaying using both methods. The degree of underpayment is much more severe under the Federal primary method.

The second issue I would like to address is the cost allocation of bridge structures.

The incremental design of bridge structures is based on the difference in the construction costs for designs which result when various classes of vehicles are applied as loadings. I have examined and found wide variations in both the methodologies and results given in seven independently generated cost allocation studies. For these the following observations and recommendations are offered:

First: The procedures utilized for the allocation of construction costs for superstructure elements through the incremental design method are highly variable and should be codified to a much greater degree.

Second: The cost allocation methodology for bridge structures should incorporate a fatigue damage assessment model. Currently, no allocation study has properly incorporated the incremental costs of bridge structures for vehicles which exceed the design loading. For these studies no added costs were assessed for the legal or overloaded vehicle which exceeded those specified in design—usually the standard AASHTO live loadings. A cost assessment based on a prorated fatigue damage degradation for structural components would serve to account for these vehicles. A surveyor of all the States appointed by the Department of Transportation reviewed this proposal and agreed that such methodology would be of great interest.

The last item relates to the bridge structures and deals with overstress of bridge elements.

The existing truck weight limits in many States have evolved over a period of years without the benefit of comprehensive analysis on the effect of these limits on bridge structures. Consequently, many special truck configurations now legally in use exceed the loading criteria specified by AASHTO for the design of bridge structures. Further, the use of the gross vehicle weight as a criterion for overstress is extremely poor.

In Maryland, of the three trucks with the highest gross vehicle weight, the truck with the lowest GVW—that is the 65,000-pound dump truck—causes the highest potential overstress; and the highest GVW—that is the 80,000-pound tractor trailer—covers the lowest potential overstress.

Further, it is suspected that much of the loadometer data collected throughout the States does not yield accurate information data concerning the actual truck GVW or axle load.

For example, when the actual GVW of the dump trucks—considered with a legal GVW of 65,000 pounds—were used as loadings on the Maryland bridges, 10 percent were well in excess of 80,000 pounds, which tolerably overstressed all spans, excessively overstressed 920 spans, and brought 50 spans to over the theoretical collapse load.

Since Federal and State regulations are flexible with respect to the length of vehicles or combinations of vehicles, it would be in the best interest of the public, the trucking industry to provide consistent axle limits and configurational guidelines for the positioning of axles such that payloads of trucks could possibly be increased without significant bridge overstress. Such a policy would necessitate a comprehensive structural analysis of the bridge structures now in place. This is possible with a computer analysis of the information on the bridges now resident within the States.

Senator SYMMS. Thank you very much.

I appreciate all four of you giving us very thoughtful testimony. We may have some questions which we will submit to you in writing. Thank you very much.

Panel No. 3: Mr. Ronald Kirby, Mr. Kiran Bhatt, and Mr. Fred Smith.

STATEMENTS OF RONALD KIRBY, DIRECTOR, TRANSPORTATION STUDIES PROGRAM, THE URBAN INSTITUTE, ACCOMPANIED BY KIRAN BHATT, SENIOR RESEARCH ASSOCIATE, THE URBAN INSTITUTE AND FRED SMITH, COUNCIL FOR A COMPETITIVE ECONOMY

Mr. KIRBY. Thank you, Mr. Chairman.

Mr. colleague, Dr. Kiran Bhatt, and I are presenting a joint statement which I will summarize.

We greatly appreciate the opportunity to testify before you today. We are from the Urban Institute, an independent, nonprofit research organization here in Washington. We have both been working on transportation financing and policy problems at the institute for over 10 years.

I will address briefly in turn the issues of highway condition, Federal financing needs versus revenues, allocation of costs, and proposals for change. I will take a little longer range view of these issues than the previous speakers that have been here this morning.

Major concerns currently about the Nation's highway and mass transportation systems contrast sharply with those which prompted the creation of the highway trust fund in 1956. Considering the profound changes in the Nation's highway needs over the last three decades, it is not surprising that a consensus is building for substantial changes in the Federal role in highway financing.

Recent popular press reports and statements by highway officials have suggested that the Nation's entire Federal aid highway system has deteriorated to an alarmingly poor state. These accounts are largely anecdotal, however, and are often based solely on subjective assessments. We believe the evidence suggests that severe problems of deterioration are confined to particular locations and types of roads. Before we make decisions on the level of financing, greater effort needs to be devoted to determining the nature and location of the deterioration in the highway system and more careful economic evaluation of benefits and costs needs to be carried out to identify the most worthy rehabilitation projects.

In assessing the needs of the Federal aid system, we first would like to raise the question of the appropriate Federal financing role in the highway sector.

The level of Federal revenues needed is obviously a function of the level of Federal responsibilities. If consideration is given to a reduced Federal role, as has been proposed in several options suggested recently by the Congressional Budget Office and by the administration, then overall Federal revenue needs may be lower than those currently under consideration by this committee. Such a situation would mean smaller increases in Federal user fees.

In our judgment, the Congress should begin to look to move in this direction as soon as possible, although there are obviously some practical and timing problems with this approach. In the short run, we would suggest that user-fee increases should have a sunset provision pending review of the Federal role, alternatively, a provision for a turnback of revenues to States and local governments along with some road financing responsibilities.

In allocating highway costs among the various user classes, we must distinguish between two types of road expenditures: Occasioned costs and common costs. As has been mentioned repeatedly by speakers this morning, occasioned costs are those that are clearly caused by road use by a particular vehicle or vehicle class; whereas, common costs are those costs that cannot be attributed to any particular vehicle or vehicle class. In contrast to occasioned costs, common costs cannot be allocated unambiguously among vehicles or vehicle classes using engineering or economic methods. The most popular, albeit arbitrary, method is to allocate common costs in proportion to vehicle miles traveled. This puts almost all the common cost burden on automobiles. There are other, somewhat more efficient and no less equitable methods available, such as the use of ton-miles or value of service to allocate common costs. We are rather disappointed that the Federal highway cost allocation study did not give serious consideration to these other methods for allocating common costs.

The pursuit of both equity among users and maximum benefits from road use dictates more emphasis on and direct reflection of occasioned costs in highway user fees. We feel that the Federal cost allocation study did a creditable job of assigning occasioned costs to vehicle classes but did not go far enough in incorporating occasioned costs into a new user fee structure.

Our proposal for user fees calls for a two-level approach to move toward greater productivity and equity. We propose occasioned cost pricing using a weight-mile tax as the first tier tax. In the long run, such a tax would encourage the incorporation of less damaging axle configurations on vehicles, which we believe is very important.

A truly precise fee structure that would minimize inequities and maximize productivity would require special sensors on heavy vehicles to monitor axle-load-miles driven. Such sensors have been used in special applications on logging roads in the United States and more generally in parts of Europe and could be available at reasonable costs in the near future for large-scale applications in the United States

In the meantime, Federal policy could begin to follow the lead taken by more than half a dozen States by introducing a simple and easily administered version of the weight-distance tax. An administratively attractive option would be to have the States collect these taxes on behalf of the Federal Government.

Since weight-mile taxes will generate only part of the revenues required to cover highway expenditures, additional user taxes will have to be imposed. In order to minimize the benefit losses resulting from these taxes, we recommend that the Congress consider allocation procedures which come closer than the vehicle-mile scheme to approximating value of service. These additional revenues can be raised through any convenient tax instruments, such as gasoline taxes and/or annual user fees. Once these taxes were applied to make up the required revenues, there would be little justification for gasoline/diesel differentials or special exemptions. We would also suggest elimination of the other excise taxes so as to keep the fee structure as simple as possible.

We believe firmly that efforts should be made to promote greater coordination of user charge policies between the Federal, State, and local levels of government. In general, all of these levels of government appear to have the same objective: To raise sufficient revenue from road users to cover highway expenditures while promoting maximum productivity and equity among users. A combined road user tax based on the principles discussed above, collected by the States, and allocated to the various levels of government according to their financing responsibilities, would appear to meet Federal, State, and local objectives. Undoubtedly, though, the Federal Government would have to take the lead in the development of such a scheme.

I would like to turn briefly to the question of using highway funds for mass transportation. Since a strong case can be made that revenues raised from road users do not adequately reflect the social costs of the noise, air pollution, energy use, and congestion associated with road use, earmarking a portion of the revenue from road user taxes is as reasonable a method as any for raising funds for Federal mass transportation assistance.

However, we believe the earmarking of new road user taxes for urban mass transportation should be accompanied by a restructuring of the Federal mass transportation assistance program along the lines recommended in the recent report by the Oversight Subcommittee of the House Committee on Public Works and Transportation. This report, we think, provides an excellent analysis of the Federal mass transportation program and well-designed recommendations for change in the direction of unrestricted block grants.

In conclusion, our suggestions for revisions to the Federal highway program are much more ambitious and involve much more far-reaching changes than the three major alternatives presently before this subcommittee. While these alternatives currently being considered would provide the revenues to respond to currently perceived financing needs, they do not provide the basic restructuring of highway financing that we feel is required by current highway conditions.

Of the three alternatives, we believe the third one takes the largest step in the direction we are recommending. The axle-weight tax would help bring payments for trucks more in line with their occasioned costs. Nevertheless, we feel a prompt and major rethinking of the level and structure of Federal highway financing is needed if we are to achieve the highway program we need for the next two to three decades.

Thank you very much.

Senator SYMMS. Thank you very much for a very excellent statement.

Now we are happy to hear from our last, but certainly not least, witness, Fred Smith.

Mr. Bhatt, do you have a statement, too, or were you accompanying Mr. Kirby?

Mr. BHATT. No, I don't have any independent statement to make at this time.

Senator SYMMS. Good. Mr. Fred Smith. Just one question. Are you associated with Mr. Joe Cobb?

Mr. SMITH. Joe was with the council, but Joe has gone to advance free market policies in the White House. I continue to work with Joe on several issues.

Senator SYMMS. I welcome you to the committee. I worked very closely with him on matters dealing with monetary and different measures. We welcome what you have to say.

STATEMENT OF FRED SMITH

Mr. SMITH. I am Fred Smith. I am director of government affairs for the Council for a Competitive Economy. I am joined by Len Rippa, director of the Office of Congressional Affairs of the National Taxpayer's Union. Len is off fighting the balanced budget fight in the other Chamber so I will be representing today both the free market and the American taxpayer.

We appreciate your invitation to participate in these hearings on the important topic of how best to preserve our highway system. The highway system of the United States, particularly the Interstate System, is the single most important element of our overall transportation system. Its survival is essential to the economic health of the Nation.

The specific questions you ask are dealt with in my written testimony. Let me now take a brief moment to raise the larger question of whether the hearings have been too narrowly defined.

In recent months, and indeed earlier today in the remarks of Senator Bentsen, we heard much about the deterioration of the public infrastructure of our Nation. Often, although not in the statement of Senator Bentsen, their statements are concluded by pleas that added tax dollars are required if we are not to sacrifice our roads, our sewage systems, our libraries, and so on. We are hearing again the argument raised by John Kenneth Galbraith many years ago—America is a nation in which our yards are lovely and our streets are filthy. To Galbraith the issue was clear: America needed higher taxes and more public spending.

In contrast, we would propose that Galbraith and more recent commentators are describing real symptoms but have failed to reach the right conclusion. Our major problem is not that our taxes are too low, but, rather, that we have failed to explore private and quasi-private ways of providing transportation and other services now provided by Government.

In fact, current transportation policies, place severe restrictions on private sector alternatives rely heavily on central Federal control and ignore such market approaches as toll financing. We believe these policies that create the problems we face today in the transportation sector and should be the subject of your attention. We suggest you address these issues and alternatives before you increase any taxes on anyone.

In keeping this philosophy, and we believe in keeping with this philosophy of this administration, we have suggestions in six areas: Emphasizing a broader role for the private sector; defederalizing the highway system; shifting to a toll based financing system; adopting an efficiency standard for highway management; shifting to cost based user financing; and finally, repealing all noncost base Federal highway user charges.

Our first recommendation is that you place greater reliance on the private sector. To do this, we believe Congress should strengthen the competitiveness of our national transportation system by completing the job of transportation deregulation. We believe all transportation subsidies, whether to Amtrak, Conrail, or the Tenn-Tom, should be eliminated.

Many of the problems of our transportation system—particularly those associated with urban mass transit—result from Government suppression of market alternatives, rather than any failure of private sector ingenuity. We see little case for any subsidy of mass transit, and no justification at all for such a subsidy to be paid by the road user.

Our second recommendations is that we defederalize and decentralize the highway program. This recommendation, of course, is compatible with the President's New Federalism program. Under New Federalism, we should look anew at all current Federal activities and ask whether these services might better be supplied by the private sector or by some level of government closer to the American people.

Obviously, if we do defederalize, our Federal road system, we drastically reduce the need for higher Federal highway taxes.

We also need to defederalize and decentralize for two important reasons: To reduce costs and to improve the management system. Costs are reduced because Federal funds are now distributed to the States with restrictions on how these funds can be used and with a series of further Federal mandates. Whatever the wisdom of these mandates, they have little to do with transportation. They merely reduce the cash value of Federal funding. Recent studies have indicated that the cost of Federal mandates is very high. See the recent work on this point by the Urban Institute and the Advisory Commission on Intergovernmental Relations.

The second gain from decentralization is to improved management. The current system of highway management is illogical. Responsibility for roads is fragmented among Federal, State, and local governments. No agreement exists on how any of these groups should manage the road system. We believe that clarifying management responsibility for each segment of the road system and then developing an efficiency oriented management policy are critical to improving the highway system.

Our third recommendation is to shift from tax to toll financing of the road system. Much of the Federal Interstate System is ideally suited for toll financing. We suggest DOT/FHWA identify those segments that are suitable for tolling and that there segment be converted to toll management before any decision to modify current tax levels is made.

I should point out, and this is not in my testimony, that the last real effort to look at toll financing was in the late thirties. At that time, it was found that as much as half of the system could be toll financed. Recall at that time, both the commercial trucking travel and a smaller use of roads by all Americans. We ought to relook at toll financing as a way to solve the highway problem.

There are five specific benefits of toll financing. First, tolls provide information feedback. Users directly signal to the road authority the value they place on their road use. Tolling makes road users customers of the road authority; toll authorities are more responsive to those using the road.

The second value of tolls is better maintenance. A politicized road maintenance process will allocate repair dollars according to the complaints of individual voters. Potholes in residential neighborhoods receive more attention relative to their economic significance than do those on the interstate. As a result, commercial users would be advantaged by a shift to toll roads.

The third advantage of toll financing is better pricing. Toll roads levy their charges at the time and place of use and therefore can better match their charges to the actual cost of using the roads. It is very difficult to charge each user a reasonable fee if you are constrained to uniform general user tax mechanism.

A fourth value is that toll roads provide a more rational way of covering the overhead or residual costs of the road system. Toll roads, as noted in my written remarks, solve this problem far more intelligently than the way FHWA recommended in their report. FHWA would have virtually all overhead costs paid by the automobile/light vehicle segment of the highway population. Their decision is inefficient and unfair.

Fifth, toll financing encourages a more productive use of roads. Let me give just one example. Toll authorities have long allowed very long and very heavy truck configurations to operate, but have made these configurations pay a much higher fee for that privilege. Toll roads have more flexibility. If you wish to operate a heavier, larger truck, you can do so, but you will be charged more. This tradeoff between heavier trucks and higher fees is less feasible for the public road system.

We suggest Congress review the toll financing studies now underway at FHWA before it makes any decision on higher taxes. I should note that several nations including France, Spain, Italy, Japan, and Korea rely heavily on toll roads to meet their intercity needs.

Let me turn now to our fourth recommendation—to move toward an efficiency based financing system. These hearings were held to solicit comments on the Federal highway cost allocation study. Cost allocation is an effort to realize some of the advantages of the private sector in Government-managed enterprises. To achieve these results one must first determine the prices that would be realized in a market for highway services, were such a market to exist. This estimation process is difficult. In my written testimony I discuss why.

Nonetheless, in our view the FHWA study is a credible effort at an extremely ambitious and difficult task. The problem was not with their analysis but, rather, their decision to ignore their findings. FHWA decided to ignore productivity considerations (efficiency) in setting charges. Yet their study found that the failure to set user charges to encourage efficient highway use may involve very large costs.

The FHWA report, in an important discussion in appendix E, estimates that the efficiency gains to the Nation of improved road pricing could be as high as $10 billion per year. To ignore a gain of $10 billion, while recommending higher taxes, seems nonsensical.

Our fifth recommendation flows from that observation. To achieve some part of the potential $10 billion gain we suggest a shift from current indirect user taxes to cost-based user charges. The recommendations before the committee fail to include any cost-based user charge mechanisms. We are asked to comment on a set of alternatives, none of which are consistent with the study on which they are based.

The FHWA study discovered two major components of road cost; congestion and wear and tear. Congestion is an important problem, but it cannot readily be handled by any Federal charge mechanism. It required some means of charging vehicles traveling at certain times of the day and in certain areas of high traffic. This problem with Federal charging does not lead us to recommend that we ignore the efficiency possible from better use of the road system but, rather, that roads be managed on a decentralized basis which would allow congestion pricing.

The other area of cost-related use, road damage, is an area which could be considered at the Federal level. The FHWA study, as you heard earlier, indicated axle loads and miles traveled were the two variables that have to be considered to charge in a meaningful way for road-related damage. FHWA suggested that mileage-based charges were too complicated to administer at the Federal level but that the States might assist IRS in collecting a Federal licensing fee. We think that step is far too modest. You could and should have gone further. States are equipped not only to collect licensing fees of the axle-weight type you propose but, far more significantly, weight-distance charges. Since both weight and distance affect road deterioration and since States can collect a weight-distance fee, you should consider a federally levied and State-administered weight-distance or axle-weight distance user charge. Such a charge component is required to track road damage costs.

The States of Arizona and Kentucky recently enacted such user charges. Several other States have for many years had such charges in their financing system. As noted earlier, the State of Idaho already levies such a weight-distance charge. Senator Symms, I am sure your State could help DOT in this area.

Our sixth and final recommendation is that you clarify the distinction between user charges and taxes. User charges should be defined more strictly than indicated in the FHWA report. Labeling a tax a user charge does not make it more acceptable. Rational highway financing would require at least that the fees levied for services be related to the costs of using the road. Under this criterion, few of the taxes included in the current Federal highway financing system can be defended as user charges

In particular, you suggested we comment on the desirability of a differential in the tax rate on diesel and gasoline. Instead, we should point out the irrationality of considering any fuel tax as a proper user charge. Fuel is a measure of road use, but not a measure of the costs of permitting such use. Neither type of use-related cost—damage or congestion—vary with fuel consumption. On a per mile basis a 50,000-pound vehicle uses almost the same fuel as one weighing 80,000 pounds, even though the latter creates about six times the damage per mile traveled. Fuel use is a very bad proxy for road damage. Similarly vehicles in congested situations use almost the same amount of fuel—even though they create far higher costs.

In neither case is fuel use an appropriate pricing method. The reliance on fuel taxes has little to do with cost allocations and much to do with the fact that such taxes raise a lot of money, and are easy to collect. The fuel levy is a tax, not a legitimate user charge.

In my written remarks, I comment on some of the other taxes in the current system. Most other taxes don't pass muster. Some are even perverse. For example, the tire tax increases if you put more rubber between you and the road. Yet the FHWA analysis indicates it would be wise to encourage people to put more rubber between them and the road. Spreading the load out reduces the damage, and thus the costs, of road use. The tire tax encourages people to increase highway costs.

Those problems all stem from a reliance on road use taxes linked only indirectly to road cost. All such taxes are based—at best—on the expected costs of road use. Statistical justice is a poor substitute for a private or toll system in which users pay directly when, and only when, they use the road. We suggest you move toward that type of system.

Senator SYMMS. Thank you very much.

I want to thank you all for your testimony this morning. We appreciate your interest in the highway system in this country. We appreciate some of the ideas you have.

I must say, commenting on this is directly from Murray Rothbard's book, there is a chapter on new liberty. He suggests that people reject the toll system, without realizing that in the near future some kind of electronic pricing device will be available. Now, because of the toll booths, you just stop and stop and stop. Delay costs people as much as the quarters they throw out, just because they have to stop and start their cars. Is there any chance we might get electronic devices which would answer that question?

Mr. SMITH. Kiran Bhatt and Ron Kirby of the Urban Institute can talk about that better than I. Technologies have been developed that are being tested in the Port Authority of New York and other places to do exactly that. Let me emphasize, however, that you don't get technology until the demand exists for it. Were we to endorse a toll road concept, technology would emerge.

Senator SYMMS. Philosophically, I certainly have no opposition to toll financing, but I can see from a practical standpoint if you must stop the traffic, then you do create another problem that has to be answered. Perhaps say a license plate, permitting you to drive on Shirley Highway at a certain time would take care of part of that.

Mr. SMITH. I think that is right. Also there is no need to price all customers the same way. The heavy vehicles, which have large variations in their per mile costs, could be required to go through the toll plaza, but the light vehicles that are just using the system, could have a flash pass of some kind.

Senator SYMMS. I want to thank you all for appearing.

The meeting is adjourned.

[Whereupon, at 1:10 p.m., the subcommittee was recessed, to reconvene subject to the call of the Chair.]

[Statements submitted for the record and responses to additional questions follow:]

RESPONSES FROM THE CONGRESSIONAL BUDGET OFFICE

Q1. The CBO Guidelines cite as a major reason for a new cost allocation study the fact that the highway program is increasingly shifting in emphasis from new construction to repair and rehabilitation. Do you believe the DOT Study has been responsive on that point in its choice of cost assignment methods?

A1. The Department of Transportation's study is responsive in this respect since it provides a separate methodology for allocating the costs of highway repair and rehabilitation. The key change is that, as pavements wear out, the Department of Transportation's study assigns the replacement costs in proportion to the wear caused by each type of vehicle. This is a significant technical improvement over previous allocation methods. It is also responsive to the shifting program mix since previous studies allocated repair costs in the same way as new construction. As a result, it should be possible for the Congress to update the study quickly in line with shifts in future spending patterns.

Q2. At the request of this Committee, CBO recently completed a study of the Interstate Highway System in which several financing options were discussed. How much of the remaining system could be completed if there were no revenue increase at the federal level? How large a tax increase would be required to finish the remaining system as currently defined?

A2. Current Interstate authorizations of $3.2 billion a year for completion would be adequate to complete about 60 percent of the remaining system by 1990. A tax increase equal to about 1.7 cents per gallon of motor fuel would be needed to increase spending to the $5.1 billion per year that we estimate is needed to complete the system by 1990.

If the Congress decides to complete the Interstate system as currently planned by 1990, as well as provide funds for needed repairs and eligible reconstruction, the resulting program would require about $10.2 billion per year, far above the total of $4.0 billion per year authorized for 1983. To support such an increase and maintain funding for the rest of the federal highway program, the current tax on motor fuels would need to be increased by almost 6 cents per gallon. This $10.2 billion estimate includes the following:

Cost Category	Annual Cost	Federal Share of Total Costs
Repair	$2.9 billion per year	90 percent
System Completion	$5.1 billion per year	90 percent
Reconstruction	$2.2 billion per year	50 percent
Total	$10.2 billion per year	

Existing authorization could be adequate, however, but only if the Interstate system were redefined and if the funds allocated to reconstruction were virtually eliminated. Alternatively, funds could be provided by reducing spending on non-Interstate programs at the expense of the Interstate. In this case, $4.0 billion could cover estimated repair costs of $2.9 billion a year, leaving $1.1 billion per year for completing the system and financing reconstruction projects. The smallest system examined by CBO--one that redefined system completion so that only routes essential to an interconnected, national road system were retained--would cost around $1.0 billion a year to complete by 1990. Virtually nothing would be left for reconstruction. Thus, existing authorizations could finance the following combination:

Cost Category	Annual Cost	Federal Share of Total Costs
Repair	$2.9 billion per year	90 percent
System Completion	$1.0 billion per year	90 percent
Reconstruction	$0.1 billion per year	3 percent
Total	$4.0 billion per year	

Q3. What do you believe are the implications of deferred maintenance, in terms of lost time, damage to vehicles, increased safety hazards, and rehabilitation costs?

A3. These costs are virtually impossible to quantify. Poor roads do impose real costs on the highway transport sector--higher vehicle maintenance costs, longer travel times and longer trips as people try to avoid bad stretches of road. For example, vehicle operating costs are about 20 to 35 percent higher on poor roads as on roads in very good condition. While a well-built road can last a long time without significant rehabilitation work, once it starts to deteriorate, deterioration escalates rapidly, so that deferred maintenance can be a very costly policy in terms of public spending on highways. If conditions deteriorate enough, long-term economic growth could be hindered as well. This is particularly true in the case of the Interstate Highway System since it carries 19 percent of the nation's total vehicle traffic and 45 percent of its large truck traffic.

Q4. The current highway user charge structure provides for certain exemptions for gasohol, buses, and state and local government and nonprofit educational vehicles. Do you believe these exemptions should continue?

A4. Current exemptions average above $760 million a year. Major beneficiaries are state and local government ($370 million), public buses ($170 million), private buses ($100 million), and producers of gasohol ($120 million). There is little economic rationale for continuing these subsidies. Abolishing them would reduce the need to raise highway taxes for other users. In total, they would generate the equivalent of about a 0.7 cents per gallon tax on motor fuel. State and local governments would bear the major burden if these subsidies were ended--both directly and for the public buses they subsidize.

Q5. Several states have implemented a weight distance tax. What are the advantages and disadvantages of such a tax? Do you believe a weight distance tax could be implemented at the federal level?

A5. Since it reflects both the amount of highway use and the relative cost-responsibility for heavy vehicles, the concept of a weight distance tax represents an ideal way to impose a heavy vehicle tax. A number of states impose such taxes, and if extended to the national level, this type of tax would permit taxes to be imposed in close correspondence to cost responsibilities. At present, however, a federal weight-distance tax is probably unadministrable without substantial cooperation from the states. In addition, it could raise states-rights issues. These problems may be surmountable and a study of them could provide a basis for substantially informed consideration. It appears premature to enact such a tax now.

Q6. The federal heavy vehicle use tax is really a lump-sum weight tax with the same annual tax being paid, regardless of the vehicle's level of use. How might that tax be restructured to match vehicle cost-responsibilities more closely and do you think states might play a role in collection of the tax?

A6. Of the current federal truck taxes, the heavy vehicle use tax provides the most direct means of taxing large trucks. It presents several problems, however: evasion is hard to detect because the revenues are too small to warrant heavy enforcement by the Internal Revenue Service; it is an administrative nuisance; and it is inequitable to low-mileage vehicles such as seasonal carriers of agricultural products. Since, on average, older vehicles are driven substantially less than newer ones, exempting older vehicles from payment of the tax might make it more equitable, although this could also significantly alter the usage within each age group. As discussed in Question 5, a weight-distance tax is preferable but this probably requires some state cooperation before it could be imposed. Another alternative would be a differential diesel tax, higher than the tax on gasoline. Such a tax would overcharge light vehicles, however, unless they were exempted from the payment of other taxes.

Q7. Why is cost allocation important and why should it be part of any debate on increasing federal highway taxes?

A7. There are two important efficiency advantages in assessing highway taxes according to costs:

1. The nation's road system will be used more efficiently. Since highway users imposing the greatest costs will be made more responsible for them, some traffic will be redistributed to other, less costly vehicle types. The resulting mix of traffic will be more efficient resulting in slightly lower costs for consumers.

2. The distribution of traffic between highway and non-highway modes will be similarly affected as highway users face their full costs, thereby creating a more efficient allocation of traffic among modes.

Q8. According to a complaint of the truckers, the wear-based method used in the Highway Cost Allocation Study attributes all damage to vehicles even though roads would require replacement due to weather, climate, and age. Why should a truck pay any more than a car does for costs attributable to these factors?

A8. Trucks should not pay any more than cars for costs attributable only to non-traffic factors such as age and weather. The Highway Cost Allocation Study specifically excluded these costs and treated them as a common cost of all road users. Thus, for each type of road damage, the DOT study estimated separately, the amount of wear due to non-traffic causes and that due to traffic.

The confusion on this point arises because many costs are attributable to both climate and traffic. For example, if no heavy vehicles use a road, a frost heave that appears during a spring thaw may eventually disappear, leaving no lasting damage. If, however, heavy vehicles using the road cause the frost heave to crack and disintegrate, then the costs of that disintegration are appropriately charged against heavy vehicles since the costs would not have been incurred without the presence of vehicles.

Q9. The American Trucking Associations maintain that they are not getting a "fair shake" with DOT's cost allocation methodology and findings. Why should heavier trucks pay a substantially higher amount in taxes?

A9. Based upon the Congressional Budget Office's review of this study, we feel that it was fair in its methodology and findings. The methodology was selected based on technical considerations without regard to its eventual quantitative results. No user group, including heavy trucks, should pay more than their fair share of taxes. The DOT study found that light trucks overpay substantially and that heavy trucks underpay--both inequities should be corrected.

Q10. In the competition for freight traffic, the railroads' share has been declining while trucks' share has steadily climbed. How much of the freight business is rail-truck competitive and how much of an economic impact do you see if taxes on the heaviest trucks are raised as much as 70 percent?

A10. Although the current economic recession has cut into traffic on both modes, the decline in the railroads' market share may have stopped. It is very hard to state with any great confidence what share of the freight business is competitive. Since rail traffic is largely concentrated in bulk commodities that are not well suited to trucks, probably relatively little of this traffic is open to truck competition. On the other hand, a large fraction of truck traffic could potentially be attracted to railroads if for no other reason than at one time it was carried by the railroads.

The economic impact of a 70 percent increase is likely to be modest since it would increase heavy truck costs by only about 1 percent. Deregulation of the trucking and railroad industries as enacted by the Congress in recent years has probably had a more substantial economic impact on relative market shares.

Q11. How closely related are the issues of truck weight, highway damage, and road-repair costs?

A11. They are very closely related. The pavement wear caused by heavy vehicles is vastly disproportionate to their weight. For example, a doubling of axle weight causes roughly a sixteen-fold increase in wear. In turn, pavement repair costs are closely tied to highway damage.

Q12. The railroads argue that they should carry loads of 50,000 pounds or more while the trucking industry continues to seek an increase in the federal weight limit of 80,000 pounds. Is there a point at which heavy truck weight becomes a significant factor in highway deterioration?

A12. There is no critical point at which further weight causes a sudden jump in damage. Rather, pavement damage increases continuously, although disproportionately, with axle weight. Gross vehicle weight is not itself a key determinant of pavement deterioration: the weight per axle is far more crucial. For example, the federal weight limit could be well in excess of 80,000 pounds with no increase in pavement damage if a significant increase in the number of axles per vehicle were also required. Gross vehicle weight does affect the relative wear and tear caused by vehicles passing over bridges, however.

Q13. What is your view on diverting highway user revenue to transit?

A13. This use of highway revenues for transit has been strongly resisted by highway interests for years. This method of financing transit reflects a judgment about the social importance of transit and the social costs of highways, a judgment that is best made by the Congress.

If highway user revenue is used for transit projects, the question arises as to how the cost of transit programs should be borne by different groups of highway users. Neither past practices nor economic theory provide any firm basis for determining how to allocate the cost of transit programs among highway users.

Q14. Do you believe adequate funds are being spent on research in the transportation field? What should be the source of funding for this research?

A14. We have not examined this area, except as it arose in the course of other analyses. One area where a greater effort could be made is in the long-term monitoring of pavement condition. This was specifically called for in the legislation authorizing the highway cost allocation study and emphasized in the CBO Guidelines. A successful monitoring effort would be the most useful way to extend the results of the AASHO road test and gain insight into what causes highways to deteriorate--for example, what is the relative importance of traffic and the environment? Given the hundreds of billions of dollars that state and federal governments will spend building and reconstructing roads during the coming decade, even a small percentage reduction in construction costs could result in huge overall savings. Accordingly, research on this topic could yield high payoff relative to costs, particularly because such a study would not necessarily be expensive, although it would require a long-term commitment by the federal government to the states.

For Release Upon Delivery
Expected at 10:00 a.m. EDT
August 18, 1982

STATEMENT OF J. GREGORY BALLENTINE
DEPUTY ASSISTANT SECRETARY (TAX ANALYSIS)
DEPARTMENT OF THE TREASURY
BEFORE SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

Mr. Chairman and Members of the Committee:

I am pleased to appear before you to discuss possible changes in the highway excise tax structure. The changes under consideration by the Committee involve both increases in the total amount of revenue to be collected from highway user taxes and shifts in the relative tax burdens imposed on different groups of users.

The Treasury Department is opposed to increases in highway excise taxes at this time. At currently budgeted spending levels, the existing tax rates should provide sufficient revenues to maintain an adequate balance in the Highway Trust Fund for the next few years. Since the Administration has decided for budgetary reasons not to support increased expenditures on Federal highway programs at this time, an immediate tax increase is not necessary.

While the Treasury Department does not support an increase in the level of highway taxes at this time, we strongly support continued reliance on user taxes to finance highway program costs. We currently are studying proposals to alter the structure of highway excise taxes so as to align the tax burdens more closely with the relative costs imposed on the system by different classes of users. We also are studying changes in the highway excise tax structure that would improve administration and compliance without sacrificing significant revenue. Our study of these issues is being prepared in response to a provision of the Surface Transportation Assistance Act of 1978, which directs the Treasury Department, in consultation with the Department of Transportation and the staff of the Joint Committee on Taxation, to review the excise taxes now dedicated to the Highway Trust Fund with respect to administrative aspects and taxpayer compliance burdens, and to recommend improvements in excise taxation that would enhance tax administration, equity, and compliance. We plan to complete our analysis in the near future. Our recommendations will take account of the findings and recommendations of the cost allocation study released by the Department of Transportation in May 1982.

In principle, the share of highway taxes borne by different highway users should be correlated with the share of costs each user imposes on the system. To the extent that some highway costs cannot be separately attributed among users, tax shares should roughly correspond with the amount of highway use.

The Department of Transportation study on cost allocation concludes that, under the current system of highway excise taxes, single unit trucks and light combination trucks pay a tax share substantially exceeding their cost share, while the tax shares of heavy combination trucks and buses are significantly less than the relative costs they impose on the highway system. Autos, pickups, and vans pay taxes roughly in line with their cost responsibilities.

The Transportation study considered three principal options for shifting the burden of the tax structure in line with cost responsibilities: raising the taxable weight threshold of the manufacturers' excise taxes on heavy trucks and truck parts and accessories, introducing a differential diesel fuel tax on fuel used in heavy trucks, and raising the threshold and increasing the rates on the heavy vehicle use tax.

The Treasury Department is currently considering the advantages and disadvantages of these proposals. Of course, no single tax can accurately match tax burdens with cost responsibilities. The Treasury believes that only a user fee structure composed of several separate taxes can assess vehicles their fair share without incurring unacceptable administrative and compliance difficulties.

An increase in the heavy vehicle use tax along the lines proposed by this Committee would improve the allocation of taxes among classes of users, defined as vehicle types, but would introduce some new inequities and inefficiencies. Because the heavy vehicle tax is imposed at the same rate on all registered vehicles in a weight class regardless of the amount of miles the vehicle is driven, it would discriminate against users with relatively low annual mileage. In contrast, diesel fuel taxes do vary with the amount of highway system use by individual operators. However, diesel fuel taxes at rates sufficient to impose a larger share of the desired burden on heavy trucks would also cause lighter diesel powered vehicles to overpay; this would suggest the need for a system of rebates to some vehicles or lower taxes on some sales.

Both increased heavy vehicle use taxes and higher diesel fuel taxes would increase problems of enforcement. Since the Federal government has no current information on truck registration, collection of the heavy vehicle use tax relies almost entirely on voluntary compliance. Higher tax rates on annual vehicle registrations would both increase the incentives for, and worsen the consequences of, noncompliance. The Department of the Treasury and the Internal Revenue Service are exploring possible ways of reducing compliance problems by enlisting the cooperation of the States in enforcing the tax.

There is much less potential for successful enforcement of an axle weight tax than for a heavy vehicle use tax based on registered weight because States generally do not register vehicles by axle load. Because of the importance of State cooperation in enforcing any type of expanded annual registration tax, the Treasury Department is giving less consideration to this option.

Finally, substantially higher diesel fuel taxes would increase enforcement problems because they would provide strong incentives to divert fuel from untaxed uses, for example, home heating oil.

We are continuing to examine the merits of increasing the share of highway revenues raised by a restructured heavy vehicle use tax and by taxes on diesel fuel. We look forward to working with the Committee on any proposals in this area.

STATEMENT OF R. A. BARNHART
FEDERAL HIGHWAY ADMINISTRATOR
DEPARTMENT OF TRANSPORTATION

BEFORE THE SENATE
COMMITTEE ON ENVIRONMENT
AND PUBLIC WORKS
SUBCOMMITTEE ON TRANSPORTATION

AUGUST 18, 1982

Mr. Chairman and Members of the Committee:

I am pleased to appear before this Committee to discuss the vital issues of highway needs, allocation of highway program costs among users, and possible modifications to the current set of Federal highway user charges. With me today are Mr. Lester P. Lamm, Executive Director of the FHWA and Mr. Anthony Kane, Chief of the Transportation and Socio-Economic Studies Division who directed the Cost Allocation Study. We will be happy to respond to your questions at the conclusion of the testimony.

As the Committee is well aware, many crucial Federal-aid highway issues must be resolved. We feel strongly that the major issues of program authorization levels, highway user fees, and truck sizes and weights are related and should be considered together.

Still under debate within the Administration are the appropriate level of Federal highway user charges and the recommended modifications to current highway user fees. While the Administration has not formally submitted a proposal to restructure Federal Highway Trust Fund user charges, the Secretary of Transportation did submit the Final Report on the Federal Highway Cost Allocation Study to the Congress in May of this year.

In brief, we have determined that current Federal user charges not only provide for no real revenue growth in a time of increasing highway needs, but also contain large cross-subsidies as a result of both existing tax exemptions and lack of graduation in tax rates as a function of vehicle operating weights.

I would like to discuss in some detail the background of the Cost Allocation Study, the approach used to allocate costs, the major study findings, and considerations for modifications to current Federal highway user charges.

Background

The Cost Allocation Study was called for by the Surface Transportation Assistance Act of 1978. Prior to this time, the Congress had not requested such a study since the Highway Revenue Act of 1956.

Congress specified in Section 506 that DOT investigate "the costs occasioned in design, construction, rehabilitation, and maintenance of Federal-aid highways" by various vehicle groups. The Congressional Budget Office (CBO) was directed to issue guidelines to assist us in developing procedures that would adequately allocate costs.

In its 1979 Guidelines to the Department of Transportation for the current Cost Allocation Study, three main reasons were cited for the need for new cost allocation analyses.

First, despite limited expenditures and severe obligation ceilings, Highway Trust Fund revenues are being outstripped by continued inflation in construction costs. User fees have not changed since 1961 and the motor fuels tax has not changed since 1959. The cash balance in the Fund has been declining for the last 3 fiscal years.

Second, Federal program emphasis and highway needs are not the same as they were in 1956. The future emphasis is on roadway rehabilitation, not new construction, with corresponding shifts in user cost responsibilities. The cost assignment methodology must clearly take this major shift into account and explicitly address roadway rehabilitation.

Third, the previous comprehensive cost allocation study was submitted to the Congress in 1961 with a supplemental report in 1965. The information used in that report is clearly out of date.

Cost Allocation Approach

As part of our recent 3-year study, we contracted with a number of expert consultants and with the States for data collection and in the development of new cost allocation methodology, revenue attribution methodology, and user charge impact assessments.

To ensure input from interested parties, we held four open public meetings that were announced in the Federal Register and established a docket for comments for the life of the study. As Congress directed, we were given guidelines for the study by CBO and we gave great weight to these guidelines. In addition, we surveyed recent cost allocation studies both by the individual States and in foreign countries.

The approach used to allocate highway costs is a "Cost-occasioned Method." That is, vehicles are held responsible for the highway capital costs that are incurred as a result of their highway use. Under this approach, each element of highway cost is examined to determine what portion is related to use by vehicles of each type. Since the use of highways by heavier vehicles causes us to build stronger, more expensive bridges, for example, heavy vehicles are assigned higher bridge cost responsibility per vehicle-mile of travel than are lighter vehicles.

By the same token, heavy axle loads cause pavements to wear out faster than light axle loads. Since the rate of pavement wear influences the total dollars needed for rehabilitation, heavy axles should bear higher cost per mile-traveled than should light axles. The basis of our pavement consumption approach is simply that rate of wear is a relevant issue in assigning cost responsibility for highway rehabilitation.

There are a number of highway costs that do not result from use of the highway by specific vehicles: the cost of building the thinnest practical pavement section, for example, to handle little or no traffic, or the cost of acquiring right-of-way, or the cost of repairing pavement wear that would eventually result even if there were no traffic on the roadway. These costs are termed "residual costs" and result directly from the decision to build or retain a highway. Obviously, the need for such a highway is related to travel, but there is no clear direct relationship between these residual costs and the use of the highway by any particular type of vehicle. In our current Cost Allocation Study, all such costs were assigned equally to each mile traveled by any vehicle. This choice of vehicle-miles traveled (VMT) is somewhat arbitrary and was made in lieu of axle-miles or passenger-car-equivalence-weighted VMT or other travel measures that would have charged trucks more.

Reasons for Changing Aproach of 1956-1965 Study.--The last Cost Allocation Report was sent to Congress 20 years ago, at a time when nearly all expenditures from the Highway Trust Fund were for new facilities. The AASHO Road Test was part of that study and the results had not yet been incorporated into a generally accepted pavement design procedure nor had they been thoroughly digested. Now, however, we are spending considerable sums to preserve existing highways with trends clearly in favor of more rehabilitation and less new construction in the future. We estimate that during the 1980s, for example, 35 to 40 percent of Trust Fund outlays will be for pavement restoration. Now, we have also had the benefit of more reflection and understanding of the Road Test results. For both these reasons, the approach taken to allocate pavement costs in the past is no longer appropriate. The old approach is adequate to assign costs of most new facility elements, with the exception of pavement, and is used in the current study with only minor modifications for such cost elements.

The old approach is inadequate for new pavements because it is not properly reflective of broadly-accepted pavement design theory and practice. According to practiced pavement design theory, a pavement is designed to "wear out" after a certain number of applications of axle loads. The point at which a pavement is considered "worn out" is specified by the designer based on the criterion of ability of the road to provide adequate service. The number of applications of axles that result in this specified wearing out are a function of the designed pavement and of axle weights. Thus, a direct measurement of relative pavement thickness required by an axle load is the relative wear-producing equivalence of that axle. The old approach, however, charges lighter axles far more for equivalent anticipated wear than it does heavier axles. There is no justification for doing so by any of our pavement design procedures. Our approach avoids the problem by charging vehicles equally according to the pavement thickness required by them.

The old incremental method is simply misapplied when used to assign pavement restoration costs. There is no theoretical basis in assuming that the share of new pavement cost for which a heavy vehicle is responsible is the same as its share of pavement restoration costs. This flawed assumption was made in the former study because of expediency and because Federal participation in rehabilitation and restoration was then negligible. The relevant issue is why the pavement to be replaced has worn out. This issue is addressed explicitly in the current study through the use of deterioration or consumption relationships. CBO had suggested that we use this approach, and the overwhelming majority of recent State and foreign studies focus on causal factors involved in rehabilitation costs of existing facilities to assign cost responsibilities as we have.

The approach we have taken for assigning pavement restoration costs is based not only on the AASHO Road Test but on the best currently available theoretical pavement damage models and the most complete pavement deterioration records on specific pavement sections that have been compiled by States since the Road Test. Over 200 pavement sections in 10 States spaced around the country have been used to verify our most reliable deterioration models. Unlike the old incremental method, the approach we have used specifically accounts for the effects of age, weather, and other environmental factors on the deterioration of pavements. In fact, the large amount of climatological and materials data needed on each pavement section makes use of the models much more difficult than applying the old incremental method, but the results are clearly worth the effort.

The deterioration models were applied to over 5,000 pavement sections chosen to represent all types of pavement and soil conditions in a wide variety of environments. The results of each section were combined using appropriate weighting factors such that the overall cost assignment accurately reflects Federal Trust Fund expenditures on pavement restoration. We do not believe that the models we have developed as part of the Cost Allocation Study are the final word on pavement damage. They are, however, a major step forward and the best we can do given the collective knowledge of highway engineers and currently available data. The models also account for a wider range of environmental factors than any previous set of damage models, and may take such factors into account far more than is necessary. If anything, we have erred on the side of attempting to include too many nonload variables.

Findings

Cost Allocation.--Vehicles are assigned costs at different rates by our study depending on the highway element (bridges, pavement, etc.) being considered. For the future Federal-aid highway program costs, heavy combination trucks (those over 75,000 pounds gross registered weight), for example, are assigned about 20 times more pavement rehabilitation costs per vehicle-miles traveled than the average vehicle, about 15 times more new pavement costs, 7 times more bridge costs, and about 10 1/2 times more total highway costs than the average vehicle.

The next heaviest combination trucks, those registered between 70,000 and 75,000 pounds, have a total highway cost responsibility of only 8 times the average; thus, it is evident that there is sharp graduation in responsibility as weights increase. For comparison, light combinations (less than 50,000 pounds) are responsible for 5 times the average cost, and single unit trucks (not including pickups and vans) are responsible for just over 2 times the average cost per mile traveled.

Equity of the Current User Charge Structure.--The present Federal highway user charge structure is comprised of the following individual taxes, which are credited by the Treasury Department to the Highway Trust Fund:

- 4 cents per gallon on motor vehicle fuels,
- 10 percent of the manufacturers' sale price of new trucks and trailers with a gross vehicle weight (GVW) of 10,000 pounds or more,
- 8 percent of the manufacturers' sale price of truck parts and accessories,
- 6 cents per gallon on lubricating oil,
- 9.75 cents per pound on tires,
- 10 cents per pound on inner tubes,
- 5 cents per pound on tread rubber, and
- $3 per 1,000 pounds GVW on trucks of more than 26,000 pounds GVW.

There are many exemptions to these taxes under current law. The major present exemptions that the Congress may wish to evaluate and the estimated revenue they would yield in 1985 under the current user charge rates are as follows:

- State and local government and nonprofit educational vehicles: $544 million (of which $89 million is for transit buses)
- Intercity buses: $32 million
- Other private buses: $67 million
- Federal truck and bus exemptions: $1 million, and
- Gasohol: $116 million.

The total annual yield from highway user charges has fallen in recent years from a 1979 peak of $7.2 billion to $6.3 billion in 1982. Yields are forecast to rise slightly over the next few years so that $7.2 billion would be collected in FY 1985 if the present taxes remained in force for that year. Of course the $7.2 billion yield of 1985 is likely to have considerably less purchasing power than the $7.2 billion in 1979.

These changes in annual revenue are caused by declining revenues from the fuel taxes offset by rising yields from the taxes on new trucks and truck parts and accessories. Fuel taxes are declining due primarily to rising average fuel economy, while the new truck and parts and accessories taxes are rising because of increasing truck sales and truck prices. As a result, motor fuel tax receipts would decline from 70 percent of total highway user charge receipts in 1977 to 59 percent in 1985 (if the present tax structure were continued); comparable shares for the sum of new truck and truck parts and accessories taxes are 13 percent in 1977 and 27 percent in 1985.

The increase in certain truck tax receipts from the current user charges will, however, by no means rectify the inequities of the present user charge structure. It will lessen the underpayment of cost responsibility by heavy combination trucks at the expense of somewhat increasing the overpayment by lighter combinations and the great overpayment by single-unit trucks.

Specifically, our analysis shows the following 1985 ratios of user charges paid to cost responsibilities: (Remember, a ratio greater than 1.0 means the vehicle class overpays and less than 1.0 means it underpays.): 0.6 for combinations greater than 75,000 pounds GVW; 0.8 for all combination trucks; 2.0 for single-unit trucks other than pickups and vans; 0.0 for buses because of the exemptions granted them; and, 1.0 for autos. It should be particularly noted that the breakpoint for underpayment by combination vehicles is 70,000 pounds gross registered weight. These vehicles represented in 1977 only 9% of all trucks, not including pickups and vans, and are being subsidized by the other 91% of trucks. Combination trucks under 70,000 pounds are currently overpaying, as are single-unit trucks.

These inequities in the current user charge structure should be reduced or eliminated. The general outlines of the required user charge changes are clear, although there is considerable room for debate about which tax is the least administratively burdensome and otherwise onerous. Further, no tax rates can be set until a decision is made on the total amount of money that user charges should raise each year.

Elements of an Improved User Charge Structure.--With these qualifications in mind, the elements of an improved Federal highway user structure are:

1. The new structure should build upon the present one because the present one already includes in one form or another many of the tax types that are practical at the Federal level and that would assess motorists as directly as possible for the highway costs they impose. We could, for example, tax motor carrier gross receipts or profits to finance highways, but we should not because neither receipts nor profits are closely correlated with the causation of highway costs.
2. As long as commodities associated with travel rather than travel itself are being taxed, we should consider the effect of user fees on consumption patterns. For example, too much tax burden on tires would encourage motorists to delay replacing tires that otherwise should be replaced for safety reasons.
3. To make the heaviest class of vehicles pay their full share of costs and to otherwise tailor tax payments to cost responsibilities, tax rates that are steeply graduated with vehicle weight or axle weight must be included in the tax structure. Although the tire tax and, to a lesser extent, the tax on new trucks will support some coarse graduation with vehicle weight, the heavy vehicle use tax is the only existing user charge type that could be modified to include fairly fine graduations by weight.

As a corollary to the need to graduate tax rates, there is a need to exempt more lighter weight vehicles from many of the taxes in order to reduce or eliminate their overpayment. These changes would have the added advantage of relieving the burden of administering user charges for millions of trucks.

4. Some consideration should be given to providing a mechanism to adjust user charges to major program cost fluctuations. While each approach has drawbacks, possible ways to do this include indexing, sunset provisions, or requiring periodic review of user fees.
5. Our examination of highway cost allocation and user fee alternatives suggests that more equitable, efficient, and enforceable user fees for heavy vehicles would result from closer cooperation between Federal and State governments. There is little doubt that the fairest user fee structure would include a tax on axle loads that varies for each vehicle with the distance traveled. Collection and enforcement of such a fee, however, is difficult under any circumstances but would be totally infeasible without State involvement. The FHWA will be working with Treasury and the States to develop a better means of collecting Federal heavy vehicle user fees in the future.

Impacts of Restructured Taxes.--The Department of Transportation has examined many user charge alternatives responsive to some or all of the considerations listed above including alternatives similar to the three committee discussion alternatives that were attached to the invitation letter to Secretary Lewis. Most of the alternatives, including Committee Alternatives 1 and 3, have come close to eliminating the interclass inequities (that is, auto versus light trucks versus heavy trucks) of the present tax structure, the inherent concern of the Cost Allocation Study. Even the best of the new alternatives continue, however, the present pattern of cross subsidies from low mileage to high mileage vehicles because administrative constraints favor continued reliance on some user charges that are invariant with vehicle use.

The impacts on motor vehicle operators of Committee Alternatives 1 and 3 stem from both an increase in user charge yield of $5.5 billion in 1985 as well as the redistribution of the tax burden among the vehicle classes. Committee Alternative 2 increases the user charge yield by only $2.2 billion in 1985 and by $3.3 billion thereafter and is not as graduated by vehicle weight as the other alternatives so would have had less impact. Equity is not well served by this alternative, however, since the current overpayments by trucks under 70,000 pounds would be made worse.

The effects computed for all three committee alternatives were very modest. The cost of owning and operating vehicles (about 30 percent of trucking firms' total costs--they are exclusive of driver labor costs, terminal costs, overhead costs, and profits associated with use of commercial motor vehicles) would rise by no more than 3.4 percent for any vehicle class under any of the 3 alternatives. The highest rise would be for the heaviest combination vehicles. Assuming that firms will be able to pass their costs on to customers, freight carried by trucks under alternatives 1 and 3 is expected to decline by about 0.4 percent and trucking firm profits also decline about 0.4 percent. It should be noted that benefits to heavy trucks would far exceed increases in user fees if the uniform size and weight laws currently being considered were enacted.

Mr. Chairman, this concludes my statement. I hope that the members of the committee find our study useful as they deliberate on highway user charge and revenue needs issues. This study by no means represents the last evaluation of factors influencing highway costs. We are confident, however, that it represents the most up-to-date and equitable approach to analyzing these issues. We would be happy to answer any questions that you may have.

STATEMENT OF SECRETARY DREW LEWIS BEFORE THE SENATE ENVIRONMENT AND PUBLIC WORKS COMMITTEE, TRANSPORTATION SUBCOMMITTEE, CONCERNING HIGHWAY NEEDS V. EXISTING REVENUES, AUGUST 18, 1982.

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

I am pleased that the Committee is conducting hearings on the important issue of highway revenues and needs. Unfortunately I am unable to attend these hearings, but I have designated Mr. Ray Barnhart, Administrator of the Federal Highway Administration to appear in my place. I have also prepared a short statement which I would like to have submitted for the record along with Administrator Barnhart's. Mr. Barnhart will address the specific concerns of the Committee in his detailed statement. However, I would like to highlight a number of issues which I believe the Committee should keep in mind as it considers over the problem of finding sufficient revenues to maintain and meet the needs of our vast highway infrastructure.

First, over the next decade, much of the nation's highway system will require major rehabilitative work. An obvious question is where will the revenues come from to help meet the estimated needs. The States will continue to be responsible for meeting most of the estimated highway needs. The Federal government must look to defining where its interests lie in helping to finance these needs. As you know, Federal financing now comes through the Highway Trust Fund, which is currently financed by a 4 cent per gallon Federal fuel tax and various other excise taxes. As you are well aware, I had recommended increasing highway user fees earlier this year in order to provide additional revenue for the nation's highway and transit programs. However, the President has decided to postpone consideration of the Department's user fee proposal until the 1984 fiscal year budget cycle. The President recognizes the need for addressing transportation infrastructure problems. However, in making the decision to defer user fee increases, he emphasized that transportation problems can be better addressed once the budget situation is resolved. I support the President in this decision.

Second, one of the issues this Committee will address during these hearings is that of cost equity among various user groups. The Department's Highway Cost Allocation Study, which was submitted to Congress in May of this year, provides us with a thorough and current analysis of how Federal highway program costs should be allocated by vehicle class. The methodology developed for this study represents a vast improvement over the approach used in the previous Cost Allocation Report twenty years ago. I believe the results of this Study will prove to be invaluable to us all as we struggle with the difficult question of adjustments in highway user charges. Among the Study's major findings was the fact that inequities exist in the current user charge structure. The study indicated that although trucks as a whole and passenger vehicles contribute approximately their equitable shares to the trust fund, lighter trucks pay significantly more than their share and thus subsidize heavier trucks.

Third, while the Department's Study did not make legislative recommendations, it did present a number of user charge options for Congressional consideration. Although we have not made legislative recommendations on cost allocation, we do have strong feelings about the timing of user charge revisions. As you may know, there is considerable consensus that truck size and weight limits need to be revised in order to increase the productivity of our commercial trucking industry. Our findings indicate that changes in truck size and weight limits come only at a cost in highway pavement wear and tear. It is for this reason that we have consistently stated that truck size and weight legislation needs to be addressed in concert with user charge legislation.

With these considerations in mind, I commend the Committee for holding these hearings and thank you for giving the Department the opportunity to testify.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WASHINGTON, D.C. 20590

OFFICE OF
THE ADMINISTRATOR

November 03, 1982

IN REPLY REFER TO:

HCC-10

The Honorable Steven D. Symms
Chairman, Subcommittee on Transportation
Committee on Environment and Public Works
United States Senate
Washington, D.C. 20510

Dear Senator Symms:

In response to your letter of September 16, we have prepared answers to the questions arising from the August hearings on highway program needs, revenues, and cost allocation issues.

The answers and attachments are herewith enclosed for inclusion in the hearing record. Please contact us if further information is needed.

Sincerely yours,

Ray Barnhart

R. A. Barnhart
Federal Highway Administrator

Enclosure

Question No. 1

In 1965 a Federal highway cost allocation study was submitted to Congress. It made use of the so-called "incremental cost" method of determining cost responsibility. The new DOT study relies on a consumption based approach. Why were the 1965 methods not used as the basis for the 1982 study, and why do you believe the consumption based approach was a better choice for the current study?

Answer

The 1961-1965 study did not take into account pavement rehabilitation and repair costs. At that time, virtually no Federal money was spent on pavement rehabilitation, so it is not surprising that such costs were not considered.

In 1977, over 60 percent of Federal pavement expenditures were to rehabilitate, repair, or replace existing pavements. By 1985, nearly 90 percent will be. The 1965 study approach to allocate pavement costs simply does not apply to our current program since it is based entirely on an analysis of new pavement costs. The so-called "consumption method" only refers to our approach for allocating pavement 4-R costs. For all other costs, the current approach is close to the 1965 approach with only minor refinements, chiefly those made possible by more readily available automated data processing.

The current approach, like the 1965 study, is primarily an incremental approach. Both approaches explicitly attempt to assign costs to those vehicles that give rise to the need for each element of highway expenditure. It is just that the answer to the same implicit question is different now than it was 20 years ago, chiefly because we spend money now on completely different highway elements.

Question No. 2

Did the incremental method used in the 1965 cost allocation study use equivalent single axle loads (ESALs) to distribute the costs of new pavements among the vehicle classes?

Answer

The incremental method of the 1965 cost allocation study did use ESALs derived from the AASHO Road tests but in a different way from that followed by the 1982 study. The 1982 study uses the ESALs to allocate costs to vehicles directly in a way parallel to a pavement design engineer's use of ESALs in designing actual pavements. The 1965 study used ESALs to design hypothetical pavements required to support traffic of incrementally increasing loads. Having designed these hypothetical pavements, vehicles that require pavements at least as thick as a given increment are assigned the costs of that increment in proportion to their axle-miles of travel. Thus, although each method yields different cost assignments, the accuracy of each depends, at least in part, on the validity of the ESALs derived from the AASHO road test.

Question No. 3

In testimony recently submitted by the American Trucking Associations, they stated that the new DOT study distributed costs of rehabilitation and reconstruction among vehicle classes on the basis of pavement deterioration miles that depend heavily on ESALs and this resulted in unwarranted double counting of heavy vehicle cost responsibility. Do you agree with this?

Answer

There is no double charging of heavy trucks or any other vehicle group in the cost allocation study. Each item of expected Federal expenditure is assigned to vehicles only once according to whatever formula will best assign costs to those vehicles that cause the cost. The fact that ESALs or factors loosely related to ESALs are used to assign a portion of both new pavement and pavement repair costs is not evidence of double charging but evidence of a similarity in the ways that these costs are caused. In fact, an argument can be made, as in the CBO Guidelines, that most new pavement costs should have been allocated in the same way as pavement repair costs since most new pavements will wear out and eventually be replaced. If this argument were adopted, a higher percentage of costs than in the 1982 report would be assigned to the heavier vehicles since the allocation method for repair costs gives a higher weight to ESAL-based or other deterioration factors than does the method actually used to allocate new pavement costs.

Question No. 4

Do you believe that "residual" or "common costs" in the consumption approach are the same as the basic road costs used in the traditional incremental approach?

Answer

The two studies adopted a similar conception of residual or common costs. In both studies, they are the costs to build and maintain a basic roadway suitable to carry light and small vehicles (autos and light trucks in the previous application of the incremental method or lighter hypothetical vehicles in the current approach). These costs are assigned by some simple allocator that shares them broadly among all motorists. The incremental approach of the 1965 study used a combination of axle-miles of travel and vehicle-miles of travel to apportion these costs among vehicles. The present study uses vehicle-miles of travel for all residual costs.

The percentage of total costs considered as residual in the approaches differs widely despite the similarity in concept. The 1965 incremental approach identified 81.4 percent of costs as, in effect, residual; the 1982 study identifies 46.7 percent as residual. The chief sources of this difference are that the 1982 study (a) identifies a much smaller proportion of pavement and bridge costs as residual, and (b) includes a much larger proportion of pavement costs, where the residual share is low, among total allocated costs.

Question No. 5

ATA stated in its testimony, "A growing body of evidence reveals that ESALs are very poor predictors of pavement performance (or damage) and particularly so for adequately designed pavements. Would you agree with this? Would you please explain how ESALs were used in the DOT study?

Answer

ATA overstates the case. ESALs are intended to measure a vehicle's effect on overall pavement deterioration (or "loss of pavement serviceability"), and they continue to be the best measure for that purpose. There is a growing awareness that more complete descriptions of pavement condition must be used to adequately manage our highway pavements. A pavement's loss of serviceability could be related to any of a number of distresses (such as alligator cracking, spalling, joint displacement, etc.), and the appropriate highway agency response may vary depending on which distress is prevalent. ESALs are not particularly suited to measuring the load effects on each and every one of these components of pavement distress, so their importance as a universal measure of deterioration is probably waning.

The Cost Allocation Study did not use ESALs to predict pavement performance or to assign pavement rehabilitation costs. Instead, individual relationships were developed between axle loadings and the most important distress types. The results of applying the new deterioration relationships show large deviance from ESALs for some distresses but fairly close agreement when all distresses on a large number of pavement sections are considered. ESALs oversimplify the deterioration effects of axle loads but provide generally adequate results when used appropriately.

Question No. 6

The DOT study assigned cost responsibility differently for new construction and for rehabilitation. Please explain how and why this was done.

Answer

The only costs of relevance to this issue in the study are pavement and bridge costs. The costs of building new bridges and pavements were assigned by methods that correspond as closely as possible to the costs of the features engineers incorporate into their designs to handle use by each vehicle class. The costs of rehabilitating bridges and pavements were assigned to vehicles in accordance with their responsbility for causing the need for rehabilitation. Since we do not know very much about the causal factors involved in bridge repair costs, these costs were treated as common or residual costs and assigned to vehicle classes on the basis of the amount of travel of each vehicle class. The approach used for assigning pavement rehabilitation costs, the consumption approach, could have been used to assign new pavement costs too, but a design-oriented approach was judged to more closely track the costs of vehicle effects on new facilities.

Question No. 7

Would you briefly outline how the AASHO Road Test information was used in both the incremental method used in the 1965 Federal Cost Allocation Study and in the cost occasioned study just completed by DOT?

Answer

The AASHO Road test, completed in 1962, derived relationships between pavement deterioration and highway use. These relationships form the basis for the pavement thickness design practices of nearly all State highway agencies. Both the 1965 and the current studies use these pavement design practices and, therefore, the Road Test's deterioration-use relationships, to assign costs of constructing new highway pavements. The 1965 study uses the same relationships to assign all pavement costs. In contrast, for assigning pavement rehabilitation costs, the current study uses updated deterioration relationships that are based not only on the Road Test but also on data from in-service highways that have been collected in the 20 years since the Road Test.

Question No. 8

Do you believe the AASHTO "Interim Guide for the Design of Pavement Structures" needs to be updated? Are the pavement thickness guidelines adequate for current traffic volumes and weights?

Answer

Yes, we believe the Interim Guide needs to be updated. The Interim Guide was developed from data obtained at the AASHO Road Test conducted at Ottawa, Illinois, during a 2-year period from November 1958 to November 30, 1960. While the Interim Guide has served well, there is a need to incorporate the latest state-of-the-art information, to make changes based upon current technology that was not available when the Interim Guide was developed, and to incorporate findings from the assessment of pavement performance. The Interim Guide was updated in 1972 and was partially updated in 1981. A project has recently been initiated through the Transportation Research Board to revise the entire Interim Guide.

Although the project to update the Interim Guide will permit inclusion of the latest information available on the subject, there is still much to be learned about the effects of axle configurations and tire characteristics and their influences on load distribution as well as the effects of the much larger load applications rates and levels now being experienced which far exceed those observed at the AASHO Road Test. The Interim Guide represents the best current available guidance from the AASHTO experts. At AASHTO's request, FHWA adopted the Interim Guide. The guide has adequately predicted the thickness of pavements for the anticipated traffic. Reduced service life and performance have resulted when the actual traffic on a facility exceeded the anticipated or predicted traffic.

Question No. 9

Do you believe inadequate maintenance has contributed to the deterioration of the roads and bridges? If so, what are the reasons for inadequate maintenance?

Answer

The deterioration of roads and bridges over time is a natural phenomenon resulting from many factors like climate, traffic loads, traffic volumes, and operational policies. Adverse action from each, or any combination of these factors can cause an acceleration of deterioration. Inadequate maintenance operations also lead to deterioration of roads and bridges. Based on FHWA field offices' annual reports of the maintenance review program, we believe routine road and bridge maintanance is satisfactory at the present.

On the other hand, rehabilitation needs are not being adequately met because of a shortage of available funds. There is a constant struggle to preserve the current condition of existing highways.

Question No. 10

At what point does the road damage and deterioration become so severe as to constitute a major, national problem? How large-scale are the highway infrastructure needs at present?

Answer

Highway deterioration, including bridges, constitutes a major problem when either: (1) conditions are such that the highway can no longer perform its intended function due to structural or design failure or (2) enough vehicles are exposed to the deteriorated conditions so that significant increases in user cost or travel time occur. Assessment of highway conditions indicates that deterioration is occuring on all highway systems. In some locations, alternate and usually more circuitous routes are being used by vehicles to avoid deteriorated facilities.

To the extent that circuity in travel and increased vehicle maintenance costs impede personal mobility, commerce, and defense preparedness, deterioration of highways and bridges is a serious concern. For example, 11 percent of total paid wage hours are currently spent on the Nation's highway system conducting business. The preliminary results of a recent study indicate that continuation of current investment trends and the associated highway deterioration would result in upwards of 14 percent of paid labor hours being spent to conduct the same level of business by 1995. Such an event implies a decline in labor productivity and other key economic indicators which is of major, national concern.

The cost of maintaining overall conditions far exceeds present levels of highway investment.

Question No. 11

Staff alternative 3 proposes a graduated axle weight tax on heavy vehicles. This proposal would permit better assignment of cost responsibilities to individual users but would be difficult to administer and may require the assistance of the States for administration and enforcement. What are your views on this proposal?

Answer

A graduated tax on axle loads is a very desirable feature to incorporate into Federal highway user charges because axle loads are a principal factor giving rise to pavement costs and because a tax that reflected these costs would encourage motorists to buy and use vehicles that cause less pavement stress. As your question suggests, the problem with a Federal user tax based on axle loads is that it would be more difficult to enforce than a tax on gross vehicle weight. Most States register their heavy vehicles by gross vehicle weight; whereas, only one (Louisiana) registers by gross axle loads. As a result, the IRS has available to it data on individual vehicles against which it could check their declaration of gross weight. Little such data exists for axle loads. We agree that State involvement would clearly be needed. Most States would also need to change the way they register vehicles.

Question No. 12

Several States have implemented a weight distance tax. What are the advantages and disadvantages of such a tax? Do you believe a weight distance tax could be implemented at the Federal level?

Answer

The advantage of a user fee that varies with both vehicle weight or axle load and distance traveled is that it would better match the way vehicles cause highway costs. It would, therefore, assess vehicles more fairly and would encourage them to consider the highway related costs of their travel decisions. The problem with distance based user fees is that there is no nationally consistent data on vehicle travel. As a result, verifying motorists declaration of vehicle travel for tax purposes would have to be accomplished by reference to many different data sources. This would necessarily involve more cost, especially start up cost, to the IRS and taxpayers than would the taxation of vehicles on weight alone but would not pose an insurmountable problem to Federal imposition of distance-based user charges. There may be other ways that heavy vehicle taxes can incorporate a distance factor, and DOT is continuing to explore them.

Question No. 13

The DOT study looked at 38 separate vehicle classes--from motorcycles to the heaviest combination trucks--in order to allocate highway costs. How did the levels of cost responsibility differ in your findings among the following truck classes: (1) pickups and vans; (2) single unit trucks; (3) combination trucks under 70,000 pounds, and (4) the heavy combination trucks over 70,000 pounds?

Answer

The report shows percentages of program costs assigned to each of 12 summary vehicle classes. To visualize user fee options, a more convenient display might be in terms of annual dollars per vehicle or dollars per 10,000 miles traveled. Either of these formats requires some assumed program level. In the tabulations below, a program level of $12.7 billion for highways, the level assumed in staff alternatives 1 and 3, is assigned based on the Highway Cost Allocation Study findings. The assigned costs are:

	Total Costs Assigned to Vehicle Class ($ Millions)	Assigned Costs per Vehicle	Assigned Costs per 10,000 Miles Traveled
Pickups and Vans	2,203	$ 63	$ 55
Single-Unit Trucks	1,003	221	170
Combination Trucks Under 70,000 lbs.	1,010	1,487	407
Combination Trucks 70,000 lbs and Above	3,213	4,549	702

Question No. 14

What were the findings of the 1965 cost allocation study with regard to light trucks and the heavy trucks each paying their fair share? Were the recommendations of the 1965 study acted on?

Answer

The preliminary results of the earlier cost allocation study were published in a 1961 report and final results in 1965. Additionally, based upon the findings of the reports, user fee recommendations were submitted to the Congress to increase the fees on trucks via two Presidential messages (House Document No. 96, 87th Cong., 1st Session, February 28, 1961; House Document No. 173, 89th Cong., 1st Session, May 17, 1965).

The 1965 report compared, for 1963, vehicle cost responsibilities to vehicle user tax payments by both the incremental and differential benefit method. Under the incremental method, approximately the same pattern of under and overpayments by vehicle classes was revealed as the recommended approach identified in the present study. In particular, it found that automobiles paid 95 percent of their cost responsibility, single-unit trucks 160 percent, and combination trucks 83 percent with the heavier 5 axle combinations paying 73 percent.

The final study results did not produce any revisions to highway user taxes. In fact, the user taxes have remained substantially unchanged since 1961. Although preliminary results from the study using the incremental method were considered in making the 1961 revisions, the revisions did not eliminate the cross-subsidies between the lighter trucks and the heavier trucks.

Question No. 15

According to the new cost allocation study, a large cross subsidy exists among truck classes. What are the weight ranges and population for the heavy combination trucks which appear to underpay as compared to the lighter trucks which are said to overpay?

Answer

By 1985, under current user fees, only combination trucks of 70,000 pounds GVW and greater underpay their share of user fees. There are projected to be fewer than 700,000 of these vehicles, which is less than 2 percent of all trucks. If pickups and vans are excluded, the underpaying vehicles represent 9 percent of the truck population.

Question No. 16

What percentage of the truck use excise tax is not being collected at present? What methods should be instituted to make certain all taxes are collected?

Answer

There are no recent estimates available from the IRS on the degree of noncompliance with the use tax, but previous estimates of noncompliance by IRS have ranged from 2 1/2 to 7 percent. An ongoing audit by GAO of California trucks should produce a reliable estimate of noncompliance in that State in 1 year to 18 months. If the tax rates are raised considerably in accordance with the findings of the Cost Allocation Study, one can expect a higher rate of noncompliance unless enforcement is intensified. The least costly method of increasing compliance would to be to enlist the aid of States by having them make the payment of the Federal tax a condition of registration of vehicles by States. This and other possible ways of eliciting State cooperation need to be further explored.

Question No. 17

In DOT's Final Report there is mention of a joint FHWA-American Association of Motor Vehicle Administrators study on state administration of the highway use tax. What have you discovered so far about the willingness of States to administer this Federal tax?

Answer

Discussions on the subject of State help in the administration of the use tax with the American Association of Motor Vehicle Administrator (AAMVA) staff and some State officials have revealed enthusiasm on the part of some States and wariness on the part of others. It is likely that even receptive States will want as a minimum, Federal reimbursement of their administrative costs and that some will want a share of the taxes collected. Unreceptive State officials fear additional Federal requirements and/or imposition of any additional conditions applied to the registration of vehicles. These related issues will be explored and clarified in forthcoming workshops comprised of Federal and State officials to be held this winter by AAMVA under FHWA sponsorship.

Since several States seem eager to participate in the administration and collection of the use tax, valuable experience could be gained from pilot agreements with such States.

Question No. 18

Proposals have been discussed that would return responsibility for parts of the Federal-aid highway program to the States. Under what conditions do you think such a turn-back would be workable?

Answer

The turnback, as presently envisioned, would return to the States the responsibility for the lowest Federal interest highway programs. As proposed in New Federalism, the revenues to support those programs would be turned back to the States. Under this concept, the States could receive a turnback of a portion of the revenues from the motor fuel taxes that are normally dedicated to the HTF. Once States have assumed full responsibility for the programs, which would be phased in over a 4-year period, they would use their own financial resources in lieu of the Federal turnback funding, which would be phased out over the same period. A criteria that might be necessary would be assurance that turnback funds would be earmarked for transportation purposes, with provisions to ensure fair treatment of rural and urban areas.

Question No. 19

Several States have successfully implemented a differential gasoline and diesel fuel tax. What is your opinion of such a tax at the Federal level?

Answer

A higher tax on diesel fuel that reflects the roughly one-third better fuel economy of diesel vehicles over otherwise similar gasoline vehicles would contribute to the goal of user tax equity sought in the Cost Allocation Study. Without such a differential, diesel vehicles would pay less of their share of the cost of highway improvements.

In addition, a higher diesel fuel tax can substitute to some degree for less equitable, non-distance-related truck taxes such as the current heavy vehicle use tax or vehicle manufacturer excise taxes. A high enough diesel fuel tax would allow removal of these other taxes from a large number of light and middle-weight trucks.

Question No. 20

Which of the exemptions within the current highway user charge structure do you think ought to be singled out for a phase out or other type of change?

Answer

Desirable changes to present exemptions from highway user charges are as follows:

-- The exemption for gasohol should be ended. This fuel is already generously subsidized by exemptions from fuel taxes in many States and by other provisions of Federal law.

-- The remaining major categories of Federal exemptions--those for buses, vehicles owned by State and local governments, and vehicles owned by nonprofit schools--should have specific termination dates provided by law so that the Congress will have to periodically decide whether the exemptions are still warranted.

-- Off-highway use of motor fuels should be fully exempted from user taxes. Under present law some such uses are now taxed at the rate of 2 cents per gallon.

Question No. 21

What effect would increasing only the Federal gas tax have on the equitable distribution of costs among the user classes?

Answer

Raising only the gasoline tax, or only the gasoline and diesel taxes together by several cents per gallon, would accentuate the major current inequities among vehicle classes. That is, the middle weight trucks, with their low gas mileages, would subsidize the heaviest trucks even more than they do already.

If the fuel tax were to be raised sufficiently high to make the heaviest vehicle classes pay their way for an expanded highway program that required approximately the same revenues as the Committee staff alternatives, the tax rate would have to be about 25¢ per gallon. Charging such a rate to single unit trucks less than 26,000 pounds would be equivalent to charging them 3.5¢ per mile, far greater than their cost responsibility of 1.6¢ per mile, even without considering the other existing user fees that single unit trucks pay.

The advantage of raising fuel taxes is that such a move would lower dependence on inequitable lump sum fees. If there were an administratively feasible way to graduate fuel taxes by vehicle weight or to establish a system of rebates for light vehicles, such a user fee structure based on high fuel charges could be very equitable.

Question No. 22

Would you briefly compare and evaluate the three alternatives developed by Committee staff along with the additional modifications which could be made to all three?

Answer

Of the three alternatives, two alternatives, labeled Alternatives 1 and 3 by the Committee staff, stem from the Cost Allocation Study findings and, therefore, would result in a fair distribution of federally financed highway costs. The remaining alternative, labeled Alternative 2, is not responsive to the study's findings and would not accordingly distribute the tax burden equitably among the user classes. Specifically, it would contain the present pattern of single-unit trucks substantially overpaying and heavy combination trucks substantially underpaying.

Alternative 2 further differs from the other two with respect to the amount of money it would raise annually. Alternative 2 would raise $10.5 billion annually after FY 1985 and $9.4 in FY 1985. In contrast, Alternatives 1 and 2 would raise $12.7 billion in FY 1985 and contain no provisions for step increases in tax rates.

There are two major differences between Alternatives 1 and 3, the two responsive to the Cost Allocation Study findings: first, Alternative 1 provides for a use tax graduated by gross vehicle weight while Alternative 3 provides for a use tax graduated by gross axle loads, and second, Alternative 1 taxes gasoline and diesel fuel at the same rate while Alternative 3 would tax diesel fuel at a higher rate. The differential tax of Alternative 3 on diesel fuel is fair and an administratively feasible option. The tax on axle loads would be a significant step forward in the direction of tax equity but it poses serious administrative difficulties. The use tax on gross vehicle weight is administratively more feasible, but not as fair.

Answer No. 22--continued

Of the very large number of changes that could be made to each alternative, two are most important. Alternative 2 is most in need of modifications that would redistribute the tax incidence away from the single-unit trucks and towards the heavier combination trucks. Each of the alternatives would be made more equitable by a shift in emphasis from taxes that are invariant with vehicle use to taxes that vary with vehicle use. This improvement could be secured, however, only at the expense of increased administrative costs.

Question No. 23

DOT has said that the issues of cost allocation, truck size and weight, and user charges should be taken up in a comprehensive legislative package. How exactly do you see the issues interrelating?

Answer

The three issues, cost allocation, user charges, and truck size and weights, are closely related and ought to be considered simultaneously in the legislative process. The purpose of the cost allocation study was to examine whether user charge burdens need to be adjusted so that the charges more accurately reflect vehicles' differential responsibilities for highway costs. If it can be shown that large and heavy vehicles will pay their fair share of costs under revised user charges, then the major obstacle to enacting more rational Federal size and weight limits will have been removed.

As the recent Federal size and weight study has shown, combining the issues is not simply a political tradeoff. The key to realizing the very large excess of benefits over costs possible through size and weight reform is to assure that the increased damage to pavements and bridges that could result be averted or promptly repaired. The extra cost can only be fairly financed if fees on heavy trucks are increased in accordance with the findings of the cost allocation study.

Question No. 24

Is it consistent to find that heavy trucks are not paying their fair share of Federal user fees and at the same time to consider increases in truck size and weight limits?

Answer

The two are consistent, provided that (a) the finding of underpayment by heavy trucks leads to user charge legislation that rectifies the underpayment, and (b) that size and weight increases not be enacted until the problem of underpayment is resolved. These provisions are the reason why the issues should be combined in one piece of legislation.

Question No. 25

Has FHWA reviewed the Causes of Pavement Damage on Interstate Highways done by Counseltrans, Inc. and the Effects of Truck Weights on Pavement Deterioration by Texas Transportation Institute? If so would you please supply that analysis for the record?

Answer

Attached are informal staff reviews of each report. AASHTO has completed a more thorough review (also attached) of the Counseltrans report, dated February 1982.

Question No. 25
September 30, 1981

Comments on: Causes of Pavement Damage on Interstate Highways (An Abbreviated Report), Counseltrans, Inc., for the American Trucking Associations and the Motor Vehicle Manufacturers Association, September 1981

The report represents the compilation of design and distress information on a large number of sections of Interstate highway pavements (1,187 miles in six States). The sample was confined to pavements over 8 years old.

Distresses on the sample pavements are divided into two categories: those caused by load and those not caused by load. For both types of distresses, the extent and severity of occurrence were tabulated such that the distresses could be ranked from most common to least common for each of the pavement types.

To compare "environmental" and "load" distresses, a variable called "mean distress index" is used. The derivation of this variable is not described in the abbreviated report, but seems to be simply averaging the occurrences of the distresses in either the load or non-load categories. There seems to be no account taken of the extent or severity of distress for a given pavement section in the calculation of this index. Neither is there any attempt made to judge the relative losses of pavement usefulness that result from the existence of each of the distresses.

Although the study is a substantial undertaking and contributes a useful set of data for use in analysis of pavement damage, the analysis contains a number of arguable assumptions that prevent the findings from being used directly for cost allocation. Among the assumptions that are questioned are: (1) the existence of a load-non-load pavement damage dichotomy; (2) the equivalence (and cost importance) of totally different types of distresses; and (3) the equal progression until failure of each distress type.

Load-Non-Load Dichotomy

The entire analysis of this report depends on the assumption that pavement distresses have but one cause: either traffic is to blame or other factors (notably weather or construction practice) are to blame. This assumption and the corresponding assignment of distress types to one or the other category are supposedly based on collective judgements of the general community of pavement experts, and several reports are cited that helped form the basis of the assumption and assignment.

In addition to being an assumption, the load-non-load dichotomy is also expressed as a finding. Based on the examination of the Interstate pavement sections, the authors specifically reject interaction between load and environment as contributing to pavement failure and reaffirm the simple designation of distresses as being either one or the other. Load and environment are seen as two separate factors for which pavements must be independently designed. No evidence is cited in the report to support this finding.

Neither the assumption nor the "finding" of load and environment independence are well supported. In fact, the previous reports cited as providing the required evidence provide none. In some cases, in fact, they provide direct refutation of this simplifying assumption.

Joint spalling, for example, is found in the report to be the most widespread of the rigid pavement distresses. It is unequivocally placed in the non-load-caused category. Yet, the primary reference 1/ for the Counseltrans Report (which is properly cited as being the most recent and thorough work on pavement distress classification), lists traffic as being a contributing factor in three of the four usual causes of joint spalling. It would be a gross simplification to consider joint spalling to be caused unequivocally by traffic with no variation due to temperature fluctuation, concrete quality, or joint contamination, but it is no better to consider severity and extent of spalling to be constant regardless of the amount and weight of the traffic passing over the joint.

A more accurate consideration of pavement distresses would be to divide them into four broad categories: (1) distresses that would not occur without traffic (but for which construction quality, climate, and materials properties obviously would have an effect); (2) distresses that occur from stresses induced either by traffic or climactic factors; (3) distresses that can occur without any traffic but that are aggravated or accelerated by traffic; and (4) distresses that occur and progress completely independently of traffic. This classification scheme would fit the distresses better, but would only partially establish direct link between cost responsibility and distress classification. All of the costs associated with the first type of distress would be attributed to vehicles based on relative damage caused, while none of the costs of the fourth group (if there are such costs) would be. The costs of the second and third groups would be partially attributed to traffic. Each of the distresses in the first three groups must be related by some damage function to vehicular traffic in order for cost assignment to be accurate.

By simplifying the classification scheme into only the first and fourth groups, the Counseltrans Report forces the most important highway distresses into the wrong categories. If they are forced into the first group, too much cost is attributed to traffic loads. If forced into the fourth group, too little is attributed. There is no reason to believe, however, given the large magnitude of the misclassification, that the two types of error are mutually compensating.

Equivalent Costs of Distresses

A second major criticism of the Counseltrans Report is that the occurrence of a distress is counted as equivalent to a different distress of any severity. A superficial crack, for example, counts the same as a section of completely broken up pavement, even though it may not reduce the usability or expected life of the pavement at all.

1/ Roger E. Smith, Michael I. Darter, and Stanley M. Herrin, Highway Pavement Distress Identification Manual, for the Federal Highway Administration, March 1979.

In order to compare the relative contributions of different pavement distresses, one must know both the relative loss in pavement usability resulting from different magnitudes of each distress type as well as the relative costs of actions needed to restore pavement usability given the magnitudes of each distress type.

In practice, there are relatively few types of maintenance and repair actions taken to restore pavement usability: joint repair, surface sealing, pavement overlays of various thicknesses, etc. It is sufficient to know the relative weightings consensually given to each distress type in maintenance decisions and the relative expenditures for each type of maintenance or repair activity. In the absence of such a weighting scheme, it is terribly inaccurate to assume that each distress of any magnitude has the same cost implications as any other.

Distress Progression

A final flaw in the use of the Counseltrans data is the use of pavement distress information for pavements that are not currently in need of maintenance or repair. This is equivalent to assuming that each distress will worsen at the same rate up until the time the pavement must be repaired.

The important variable to consider is the relative contribution of each distress type at time of overlay (or joint repair, etc.). Suppose one distress, for example, causes measurable but tolerable pavement roughness in the first year of pavement service but gets no worse for the next 10 years. Another distress appears at 9 years but proceeds rapidly and requires that the pavement be completely overlaid. Obviously, the second distress is much more responsible for pavement repair cost than the first. Examining the pavement at age 9 years or less, however, would rate the first distress more important. Since this report considers pavements of various ages without regard to current usability, the results are systematically biased to show earlier-occurring distresses to be more important than they actually are.

Conclusions

The data presented in this report are a useful addition to our knowledge of pavement deterioration and should serve as a reference in discussions about pavement damage responsibility. The share considered to be not related to load, however, is probably overestimated given: (1) the misclassification of interactively-induced distresses; (2) the lack of appropriate distress weighting factors; and (3) the tendency of the distresses that are not most strongly related to load to appear more rapidly than the strongly load-related distresses.

Question No. 25
November 10, 1981

Comments on:

Effects of Truck Weights on Pavement Deterioration,

R.L. Lytton, T. Scullion, B.D. Garrett, and C.M. Michalak,

Texas Transportation Institute for ATA and MVMA,

June 1981

The report documents work done by Lytton at Texas Transportation Institute (TTI) and Darter at Illinois on developing pavement deterioration relationships using empirical data and on combining these relationships into models of the need for pavement rehabilitation through the use of priority-setting models used by several States. Distresses were divided into three categories: those caused by load, by climate, and by combined forces of load and climate. Since each distress, according to the State-based priority models, has a determinable effect upon the decision to rehabilitate and since each distress is categorized by cause, the report then is able to estimate the overall contributions of load, climate, and combined forces to the decision to rebuild highways. Further, since distresses are given as functions of traffic, it is possible to extend the results of this report and determine relative contributions of the various vehicle classes.

The work being done by Lytton and Darter as part of the Federal Highway Administration's (FHWA) large contract with BRE, Inc., is very similar to the work reported here. In some respects this report could be considered a preview of the forthcoming results of that contract. Therefore, the following comments apply in many cases to the ongoing research, as well as to the American Trucking Association (ATA) report.

Data on Existing Pavement Sections

The report makes use of the large data base developed by Darter of Illinois for jointed reinforced concrete pavements as well as a large number of pavement sections compiled by Lytton in Minnesota, Utah, and New York. Various missing data pieces in each State limited the utility of many of the sections, but a very respectable number were used for development of the empirical models.

The major limitation of the body of data, however, is the lack of adequate traffic information. Even when sections are used that are reasonably close to loadometer stations and even when it can be assumed that the few annual hours of truck weighing are representatives of the entire year, the best that can be hoped for is reasonably accurate estimation of 18-kip ESAL's. Nowhere are there pavement sections with sufficiently complete information to evaluate the effects of different loading spectra for a given ESAL application level. Thus, the empirical models that express damage as a function of an exponent of ESAL's really cannot directly estimate the proper exponent to convert axle weights to load equivalencies even when they do adequately account for a number of applications of average distribution axle loads. This is a general limitation of available empirical data and in no way criticizes the report authors.

Furthermore, even if exact loading spectra were known for each highway section, the spectra would be similar enough that the variations in distresses would probably be impossible to conclusively ascribe to various individual axle-loads. There are not enough adequately-documented pavement sections on parkways, adjacent to weigh stations, etc., to produce rigorous empirical functions. Even if there were, only the most rudimentary, heavy-axle versus lack-of-heavy-axle distinctions could be made rather than the strong weight functions that would be necessary to update the American Association of State Highway and Transportation Officials load equivalencies.

Use of ESAL's in Regression Equations

The typical form of the regression equations describing pavement distress includes both number of ESAL applications and time since last maintenance. Given the sources of traffic data, the two variables are totally collinear for any single pavement section and, assuming consistency in design practice, are highly correlated with respect to all similar pavement sections. Because of this collinearity, the exponents of time and ESAL could be expected to shift substantially for small changes in the data, and numerous alternative equation forms could fit the data equally well.

Similarly, there is neither sufficient rigor in the data nor independence among the variables to consider the use of axle-weights raised to various exponents as an alternative to ESAL's. Raising the number of ESAL's to an exponent is not equivalent to raising individual ESAL's to an exponent and summing them. In fact, similar correlation exponents could be expected if ADT, axle-passages, or the 10th power of axle-weights were used in the correlation equations.

Since traffic data are relatively similar across large classes of pavement sections, and since the resulting correlation equations could have a number of variables as substitutes for other variables, there are obvious limitations in the use of limited empirical data. Existing models of pavement deterioration can be supported or refuted by the data, but there is little hope of constructing entirely new models based solely upon the data.

Use of "Linear Assumption" for Deduct Points

As described in this report, individual State deduct point tables are converted to universally-consistent tables by assuming equal weighting to both area and severity of the distress. The example shown on page 15, however, is neither consistent with the State's table nor with an equal-weighting assumption. Severity of the distress only has a 10-point effect on deduct value while area is given 20 points. The original State table shown on page 14 gives 13 to 20 points variation to severity and 8 to 15 points to area of distress. A more faithful linear assumption algorithm would linearly interpolate between a table's 4 corner points or, if that is too complicated, would at least choose point variations that are within the range of the State variations.

The deduct point determinations shown on page 15 produce a systematic bias toward showing more importance to area than to severity. If area of a distress is less determined by load than is severity, the net result is a discounting of the importance of load as a cause of pavement determination.

Direct Use of Deduct Points

The report uses raw deduct point values to determine relative contribution of various pavement distresses to the decision to overlay. Another, possibly better, approach would be to consider the variations in deduct point values that result from various traffic levels. For example, if transverse cracks appear early in a typical pavement's life, they may contribute substantially similar deduct point values to all pavement sections. If that is the case, transverse cracks are a given factor that does not really contribute to a decision to overlay. Instead, the distresses that vary are the ones that affect the decision.

Traffic-Related Deduct Points for Non-Traffic-Related Distresses

The deduct value approach to analyzing a decision to overlay assumes that the individual distresses prevalent at the time of the decision are direct, prima facie determinants of that decision. Overlays are to a large degree, however, undertaken as preventive measures.

The typical failure progression for flexible pavements documented in this report illustrates the lack of a direct tie between the causes of current pavement condition and the need to overlay. Transverse, temperature-change-caused cracks are serious primarily because they lead to multiple cracking and eventually alligator cracking. If overlays are made at the multiple-cracking state primarily to prevent further deterioration, it is not multiple-cracking *per se* that caused the overlay, but rather fear of alligatoring. Thus, a State may assign large possible deduct point values to multiple cracking based on a pavement's increased sensitivity to load damage rather than based on the actual loss of serviceability caused by multiple cracking. To the extent that deduct point values are based upon the implications of future traffic, they are traffic-load-related, even if the distresses to which the deduct values apply are not.

Distresses Before Overlay vs. Distresses at Overlay

The pavement sections studied in this report were not necessarily about to be overlaid, and in fact generally were not. Since distresses occur at differing rates and have differently-maturing S-shaped curves, there will be a systematic bias against estimating the importance of later occurring distresses when S-shaped curves are fitted to only the bottom of the real curve.

The most important, strongly load-related distresses (such as rutting and alligator cracking for flexible pavements) occur much later than the most prevalent distresses that are not strongly related to load (such as transverse cracking). Thus, there will be significant underestimation of load-related distresses becuse of this use of the data.

Determination of Nonload Related Share

This report attempts to consider pavement damage as load-related, climate-related, or a combination of the two. The reason for so categorizing is not entirely clear, since climate is beyond our control. For cost allocation, the appropriate question is simply how pavement deterioration costs vary with traffic given the range of climates, construction practices, material qualities, etc. The converse of that question is to what extent pavement deterioration costs would occur in the absence of traffic, but this is not completely to attempting to categorize distresses as entirely climate-related.

The attempt should be made to hypothetically remove traffic from a highway section and correspondingly track pavement deterioration costs. Using individual pavement distress functions such as have been developed in this report, the appropriate estimate of non-traffic-related share could be derived by comparing the estimated service life of a pavement not subjected to traffic to an identical pavement subjected to full traffic. The estimate of anticipated service life would have to account for some of the implicit deduct-point assumptions mentioned earlier, but could provide a meaningful estimate of traffic-related pavement deterioration if this is done.

Question No. 26

In the FHWA testimony last month, there was mention of a study recently done by FHWA of tire and vehicle damage caused by deteriorated highways. Would you please supply a copy of that study for the record?

Answer

The study report referred to is titled "Vehicle Operating Costs, Fuel Consumption, and Pavement Type and Condition Factors." It was prepared under Federal Highway Administration contract number DOT-FH-11-9678 and issued in June 1982. Copies are available to the public through the National Technical Information Service, Springfield, Virginia. A copy of the report is attached and submitted for the record.

VEHICLE OPERATING COSTS, FUEL CONSUMPTION, AND PAVEMENT TYPE AND CONDITION FACTORS

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
OFFICE OF HIGHWAY PLANNING

MARCH 1982

[The following has been excerpted from the above named report. The complete report has been retained in the committee files.]

CHAPTER 7. SUMMARY, RECOMMENDATIONS, AND CONCLUSIONS

SUMMARY

The determination of the influence of roadway conditions on vehicle operating costs, emissions, and accident rates is a very difficult task. The only component of vehicle operating cost which can be measured directly in experiments is fuel consumption. Allocation of the other components of vehicle operating costs must be done based on theory, logic, and judgement.

In terms of new contributions to the state of the art, this research produced significant advances in four areas. The experiments conducted during this research provide valuable new evidence on the effect of roadway characteristics on fuel consumption. The successful application of the slip-energy model for predicting tire wear provides a basis for updating tire costs in a judicious manner; as new tire technology is developed, this theory can be applied if two parameters are experimentally established. Similarly, the application of Daniel's theory on vehicle depreciation to the data collected by the U.S. Census Bureau establish a rational basis for computing depreciation costs. Finally, the assembly and analysis of a data base on the effect of roadway roughness on accident rates demonstrated that, in general, there is no significant relationship between pavement condition and accident rates.

Winfrey's original allocation of oil and maintenance and repair costs were updated with current price data. In addition, the procedures used for allocating these costs have been more completely documented so that these costs can be readily updated in the future.

Finally, new evidence from Brazil has been applied to quantify the influence of pavement condition on the non-fuel components of vehicle operating costs. The primary data base generated in Brazil is the first hard evidence of the interrelationship between vehicle operating costs and roadway characteristics.

TECHNIQUES FOR UPDATING COST TABLES

Due to changes in technology and costs, the total vehicle operating cost tables presented in this report will become dated. Therefore, considerations were given to updating the cost tables. If the cost tables become dated due to changes in unit prices, then the consumption tables given in Appendix B can be used to generate new total cost tables. However, this will require a lot of work due to the number of calculations required. If the change in prices is due to pure inflation, i.e., uniform increase in prices, then the costs in Appendix A can be updated by applying an inflation factor.

A quick method of updating the cost tables when there are differential changes in the unit prices could be developed by performing a sensitivity analysis on the tables with respect to how changes in the unit price of a component affect the total costs. From this analysis, weighting factors could be developed such that differential changes in unit prices could be appropriately incorporated in generating new operating cost tables from those presented in this report.

Changes in vehicle technology can have a major influence on how costs are assigned to the roadway. Generally, this will require regenerating the consumption tables as given in Appendix B. The approach described in this report provides a basis for estimating how the components of vehicle operating can be assigned to roadway characteristics.

In some cases, it may be desirable to use different vehicle types than included in this report. In these cases, the basic methodology used in this project can be used to allocate costs to new classes. New vehicle types will normally vary from the types reported herein by either having different weights, different motor types (gasoline or diesel), or a combination. If the only difference is the weights, then the ratio of horsepower for the new vehicle type to the existing type may be used to estimate the consumption rates from those in Appendix B. If the new vehicle type has a different fuel type, then the following considerations should be applied:

1. Fuel - The most important consideration in extrapolating fuel costs to different vehicle types is the type of fuel used, gasoline or diesel. In general, diesel motors get in the range of 40% to 80% better fuel economy than gasoline motors used in the same application. Differences in fuel economy between gasoline and diesel vehicles were examined in detail in the Interim Report. Based on this information, Table 32 was compiled for estimating the differences in fuel consumption between gasoline and diesel motors for equivalent applications.

2. Oil - Since oil consumption is a relatively small cost factor, using the ratio of the mileage between oil changes for a different vehicle class to the mileage between oil changes for the vehicle in this report which is similar to the new vehicle type, will be adequate for updating oil consumption.

3. Tires - The slip-energy theory can be used for estimating tire wear for any vehicle types.

4. Maintenance and Repair - It is known that on the average, maintenance and repair costs are lower for diesel powered vehicles than gasoline powered vehicles. Winfrey's cost tables (Ref 2) indicated that this factor may be 8% for semi-trucks. However, this number should be used with caution.

5. Depreciation - Diesel powered vehicles, especially trucks, generally have a longer service life than gasoline powered vehicles. This difference can be offset by using different maintenance schedules for the two vehicle types. In view of the lack of data for estimating different service lives based on motor types, and the complication generated by maintenance costs, no recommendations can be made for a differential use-related depreciation schedule for gasoline versus diesel powered vehicles.

Table 32. Factors for estimating the differences in fuel economy for gasoline and diesel vehicles.

Vehicle Type	Gasoline Consumption / Diesel Consumption (gpm)
Automobiles	
Small	1.38
Medium	1.72
Large	1.72
Trucks	
Pickup	1.39
Single Unit	1.50
Semi's	1.4 to 1.8

RECOMMENDATIONS

Although significant progress has been made on this research toward the correct allocation of vehicle operating costs across the various roadway characteristics, the greatest single improvement in the allocation procedure could be achieved through a detailed study of vehicle operational parameters. Little information is available to quantify the percent of time. or distance traveled, that is spent in the various modes of operation, and at particular operating speeds. This information is important for allocating all of the non-fuel cost components.

In this research, the effect of pavement condition on the cost of the non-fuel components was allocated based primarily on research performed in Brazil where extreme roughness conditions existed. However, the fuel experiments in this research did not substantiate the effect of roughness on fuel consumption which was defined in Brazil. Thus, the question of the transferability of the Brazil data to the United States is raised.

The emissions models used in this research are based on the best available information. However, the automobile emissions models were published in 1974, and the truck emissions data were not collected to be modeled in the manner used in this research. Hence, new data should be collected to improve the reliability of the estimates made in this research.

The accident analysis performed in this research was based on the best available data. However. since these data were not originally collected for the type of analysis which was performed, the level confidence of the results could be improved by a more in-depth data collection effort.

CONCLUSIONS

Aside from the updating of the vehicle operating cost tables for economic analysis, several significant results were established in this research:

1. Fuel consumption is not influenced by the type or condition of paved roads for the range of conditions commonly encountered in the United States.

2. Non-fuel vehicle operating costs are influenced by pavement condition.

3. The slip-energy model can be used to estimate tire wear as a function of vehicle, roadway, and operational characteristics.

4. Daniel's theory on the separation of vehicle depreciation into use and non-use portions is reasonable and can be applied to existing data.

5. Accident rates are not significantly influenced by pavement condition for the data set analyzed.

Question No. 27

One of the charges against the new DOT cost allocation study is that "economic theoreticians", rather than highway engineers, did the analysis. What is your response?

Answer

The study was undertaken by an FHWA team that included 4 engineers and 1 economist. This team was assisted by many other engineers and economists under contract to the FHWA as well as by input from many other spokesmen for groups having a diversity of expertise and training.

The allocation of highway costs and the translation of allocated costs into user charges is a subject that overlaps the disciplines of economics and engineering. Engineering knowledge is essential because the identification of costs is bound up with the way highways and bridges are designed and how they wear out. Economic knowledge is required to identify which costs should be reflected in user charges, how they should be measured when more than one engineering approach to cost measurement exists, how they should be translated into user charges, and what the impacts of such user charges might be. Together, the two approaches can devise cost allocation methods and derivative user charges that are fairer and contribute more to overall economic productivity than could either alone.

Question No. 28

Several of the States have recently done cost allocation studies. Would you very briefly summarize their methodological approaches and findings?

Answer

Since 1972 about 25 States have either completed or have underway highway cost allocation studies. These studies vary greatly in the details of their methods but all have adopted a policy of assigning costs to those that occasion them rather than assigning costs in proportion to benefits received from highway improvements. All have adopted a basically incremental approach: they have identified costs that are not clearly caused by particular vehicle groups (variously called basic, common, or residual costs) and distributed these costs to all motorists using some simple measure of use such as vehicle-miles of travel; additional, or incremental, costs above basic costs are allocated to vehicles that gives rise to them.

This generally incremental approach followed in all recent State studies as well as the 1965 and 1982 Federal studies is to be distinguished from the special "incremental" approach to pavement cost allocation followed in the 1965 Federal study. Some recent State studies have continued to use the special incremental approach for pavement costs from the 1965 study but many others have used approaches for both new and repaired pavement costs similar to that used in the Federal study--that is equivalent single axle loads have been used directly to allocate part of these costs.

The allocation of other items of expenditure besides new pavement and pavement repair costs are less controversial and there seems to be considerable convergence in the overall approaches to allocating these items.

One difference of note between the Federal and State studies is that State studies commonly assign a portion of highway costs to non-users while the Federal study did not. This assignment of costs to non-users rests on the debatable proposition that costs associated with the land access function of highways should be borne by non-users. Since land access roads are typically financed with State and local aid rather than Federal-aid,

Answer No. 28--continued

it is proper that the non-user share issue be addressed by State studies but not the Federal study. Another notable difference between the Federal and State studies is that new pavement and pavement repair costs are typically a much lower percentage of total costs at the State level than at the Federal level. Therefore, findings of State studies are less affected by the method used to allocate pavement costs than in the case of the Federal study.

No direct comparison of cost responsibilities to user charges is available from a comprehensive review of individual studies. The draft final report from an FHWA-sponsored study that looked at cost responsibilities versus user charges payments across all levels of government for 1977, however, shows the same pattern of underpayments and overpayments as shown by the recent Federal study. This look at all levels of government used, whenever applicable, the recommended approach from the Federal study, but went beyond it to look at all publicly financed highway costs and all user charge payments.

Qestion No. 29

What assistance is being provided by FHWA to States that have highway cost allocation studies already undeway or are planning such studies in the near future? What are the differences between a Federal cost allocation study and a similar study at the state level? Do most States seem aware of the need to structure cost allocation studies around their own particular needs and goals, or do you see States attempting to use the Federal study as an all-purpose model?

Answer

The cost allocation study team has given direct technical assistance to several States that have had ongoing studies. This assistance must be very limited because of staffing constraints. The major assistance in the future will be in the form of a manual of technical assistance, currently being prepared for State studies. The manual will describe a range of possible approaches that can be used for State cost allocation studies.

State studies differ in several ways from the Federal study. First, vehicle use and operating characteristics vary considerably from State to State. Thus, nationwide average characteristics are simply not generally valid for individual States. Second, there are significant differences between State highway program mixes and the Federal program mix. Federal expenditures are much more weighted toward capital investments and the major highway systems than are State expenditures. Finally, the methods of assigning costs in the Federal study may not particularly match the design or operating policies of individual States since these methods are based on the most prevalent nationwide practices.

Many States are fully aware of the need to tailor their studies. Unfortunately, time, staffing, and budgetary constraints produce a strong temptation to States to attempt to reach cost allocation conclusions directly from Federal study results. Some States will undoubtedly misapply our results, but we consistently warn them against the direct use of our conclusions for individual State highway cost allocations.

Question No. 30

How feasible is toll financing for the Interstate System? What have DOT studies shown about the toll road option?

Answer

The feasibility of toll financing on the Interstate and other Federal-aid systems is an issue that is receiving increasing attention throughout the country as highway needs continue to far exceed available tax revenues. Certainly the higher traffic volumes and limited access of Interstate System routes make them attractive candidates for toll financing. However, since 1916, Federal policy has prohibited tolls on all highways constructed with Federal aid.

We are presently examining a number of options to grant States and localities greater flexibility in imposing tolls on Federal-aid system routes, especially in areas where other sources of revenue for highway improvements are insufficient. No conclusions have as yet been reached regarding the most practical and equitable approach through which to provide this flexibility.

Question No. 31

Do you believe that adequate funds are being spent on research in the transportation field? What should be the source of funding for this research?

Answer

The FHWA's contract research and development program has been funded at a rather modest level averaging less than one-third of 1 percent of the agency program over the last 10 years. Current resource levels prevent acceleration of research and development activities in many high priority areas where application of new technology could prove cost effective.

Besides the FHWA highway research, there are the Federally-assisted Highway Planning and Research (HP&R) Program as well as State research programs. In general, the problems addressed by these programs are more regional or local in nature, but do help supplement Federal highway research.

Highway user fees should support this research, as they do now.

AMERICAN ASSOCIATION OF STATE HIGHWAY
AND TRANSPORTATION OFFICIALS

JOHN A. CLEMENTS, President
Commissioner
New Hampshire Department of Public Works
and Highways

FRANCIS B. FRANCOIS
Executive Director

STATEMENT BEFORE THE
SUBCOMMITTEE ON TRANSPORTATION
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

Relating to

CURRENT HIGHWAY NEEDS versus EXISTING HIGHWAY REVENUES

by

JOHN A. CLEMENTS

Commissioner and Chief Administrative Officer,
New Hampshire Department of Public Works and Highways

and

President, the American Association of State
Highway and Transportation Officials

August 18, 1982

Founded in 1914, AASHTO represents the departments concerned with highways and transportation in the States, the District of Columbia, and Puerto Rico, to foster the development, operation and maintenance of an integrated national transportation system. The active members of AASHTO are the duly constituted heads and other chief directing officials of the member highway and transportation agencies.

EXECUTIVE OFFICE: 444 N. Capitol Street, N.W., Suite 225 Washington D.C. 20001 Telephone (202) 624-5800

Mr. Chairman and members of the Subcommittee, my name is John A. Clements. I appear here today both as President of the American Association of State Highway and Transportation Officials, and in my capacity as the Commissioner and Chief Administrative Officer of the New Hamsphire Department of Public Works.

We were pleased to receive your invitation for AASHTO to testify at this hearing, to offer our views on the needs of America's highways and the adequacy of current revenues to meet those needs. In our testimony today we will endeavor to provide an overview of our highway needs, and will offer some observations with respect to the adequacy of revenues and how they should be raised. While your invitation asked that we also address the allocation of costs among highway user classes and comment upon certain proposals to change the structure of highway user fees, AASHTO is not fully prepared at this time to offer detailed comments on the recommendations of the Federal Highway Administration's Cost Allocation Study. We are very concerned about the issue, however, and strongly suggest users paying their fair share of highway costs.

You are aware that the Federal Highway Administration's "Final Report on the Federal Highway Cost Allocation Study" was submitted to Congress on May 13, 1982. We have not had the time since then to complete a thorough analysis of the document, although it is under review by member departments and by both our Highway Subcommittee on Highway Transport, and a special Task Force on Cost Allocation appointed by the Chairman of our Standing Committee on Planning. We hope to be in a position to offer specific comments and recommendations on the Final Report at the beginning of the next session of Congress.

While I cannot now give you AASHTO's official position on cost allocation issues, we have encouraged a number of our member departments to take part in these hearings to provide you with their own views on this complex subject matter. It is from these individual member departments that an AASHTO position will ultimately emerge, and we are certain they will provide much information of value to the Subcommittee.

To further assist the Subcommittee, Mr. Chairman, we have assembled documents from several states which examine the issue of how to allocate highway user costs among the several user classes, and are submitting them with this testimony. Included are cost allocation documents from the following states:

Colorado
Connecticut
Florida
Maryland
Missouri
Oregon
Wyoming

As you will observe from reading these documents, Mr. Chairman, the cost allocation issue is approached in different ways by the states. However, there is general agreement that costs should be allocated to the different user classes on the basis of the demands they place upon the highway system. Commonly, our state legislatures attempt to establish a balanced system of user fees that is fair to all. This is difficult to achieve, especially since as time moves on and vehicle characteristics and patterns of usage change, so do the equities involved.

At the Federal level, it was of course Congress' concern about the proper allocation of highway user costs that resulted in the FHWA study leading to the Final Report now before you.

Mr. Chairman, we commend you and the members of this Subcommittee for taking the initiative and holding this hearing, to begin Congressional consideration of the highway user cost allocation issues. Your hearing, Mr. Chairman, should help focus all involved toward specific recommendations, something which we must do if new revenues for our Federal-Aid highway program are to be enacted by the Congress. This focusing effort is especially needed, since the Final Report produced by the FHWA does not contain any specific recommendations on a course of action.

In your invitation for our appearance, Mr. Chairman, you identified five specific issues on which testimony is wanted. Our comments on each of these areas are as follows:

(1) The condition of the Federal-Aid highway system and factors affecting the service life of the system.

In recent years, the states have cooperated with the Federal Highway Administration in evaluating the condition of our nation's system of Federal-Aid highways, and the FHWA has provided you a report on this subject. Generally, we concur in the findings of that report.

The FHWA report on the condition of our nation's highways indicates a serious problem is developing in our Interstate system, with some 10 percent of the mileage now in need of rehabilitation. The mileage needing rehabilitation will grow each year, and over time the entire 42,000 plus miles will need 4R work. The plain fact is that like all other man-made objects, and following the inexorable dictates of known engineering principles, our highways do wear out.

Turning to our primary and secondary highway systems, essentially every state and local government has some serious deficiencies. There are several states who believe the Federal Highway Administration understated the needs of these two systems. It must be remembered that much of our primary and secondary mileage is far older than our Interstate highways, and again the principles of engineering dictate that sooner or later serious problems will develop on these systems.

The serious condition of many of our nation's bridges has received wide publicity lately. Bridges in need of rehabilitation and replacement can be found across the nation, both on and off our Federal-aid Highway system. Our bridge needs are indeed large, and studies have clearly demonstrated the human and economic costs associated with bridge closures.

Because the evidence substantiating the serious condition of much of our nation's highway system has already been well documented, I will not go into further detail at this hearing. If we can assist you in obtaining specific information on any element of the Federal-Aid Highway system, do not hesitate to let us know.

You have asked both how serious is our highway problem, and what are the factors that affect highway service life. The service life of a highway is determined by several factors, including:

1. The quality of the original engineering design. Sound engineering principles need to be followed in the design and construction of a highway, and AASHTO has long been dedicated to helping assure this is common practice. Pavements must be properly designed, elevations correctly established, loadings properly analyzed, and so on.
2. The quality of the materials utilized in construction.
3. The quality of the workmanship employed.
4. The success of efforts to properly regulate highway usage, so that engineering limits are not exceeded.
5. The value of the axle loadings applied to the highway, considered together with the frequency of those loadings.

Generally, highways built over the last several decades have been properly designed and constructed to handle projected 20 year axle loadings and traffic frequency. Once constructed, a highway must also be properly maintained, and maintenance must be done in a timely manner if catastrophic events are to be avoided. Our states and local governments generally have established programs designed to properly maintain our highways, although resources for maintenance are today severely strained in much of America.

Given good design, construction and maintenance, a highway should last its intended service life. But that life is still finite, and usually a 20 year timespan is chosen by the engineer as the most reasonable cost-benefit goal.

The intended service life can be considerably shortened by increasing the intensity and frequency of the axle loadings placed upon the road. It is well established that axle load weight and the frequency of loading are the principle factors affecting how rapidly a highway will deteriorate.

Turning again to our system of Interstate highways, these were designed for a normal 20 year life. However, in many instances our Interstate highways are deteriorating at a rate faster than planned. This is occuring largely because axle weights have been increased above the design value, and because traffic volume is larger than anticipated.

Recently, the American Trucking Associations produced studies attempting to show that environmental factors are the principle influence in highway deterioration, and that increased loadings are much less a factor than is commonly argued by highway engineers. We understand that copies of those studies have been made available to the Congress, and thus we are submitting with this testimony a copy of our analysis of the studies. It is titled "A Review of 'Effects of Truck Weights on Pavement Deterioration' and 'Causes of Pavement Damage on Interstate Highways,'" and was prepared by our Highway Subcommittee on Highway Transport and approved in a ballot by our Standing Committee on Highways. The AASHTO report concludes that the two studies commissioned by the American Trucking Associations are not well founded, and do not support their stated conclusions.

We believe that increases in truck weights and consequent increases in axle loadings do in fact hasten highway deterioration, especially when coupled with increased traffic volume. We do agree that environmental factors can affect the deterioration rate of a highway, under certain conditions; but we cannot agree that they are the principal cause of the deplorable condition of so many miles of America's highways as we enter the 1980's. The AASHTO report sums up our position as follows, at the top of page 2:

> ". . .loads and environmental factors interact, one reinforcing the other, to cause pavement distress."
>
> ". . .many non-load types of distress are aggravated or intensified by loads, so that significant portions should be attributed to load related causes after the inception."

Summarizing, then, the deterioration of a highway can result from several factors. Assuming good design, materials, workmanship and the proper regulation of use, any highway will still begin to deteriorate as it nears the end of its design life. In these instances, the cause of highway deterioration is simply old age. It should also be noted that when axle loadings and trip frequency fall significantly below the engineering design standard utilized to construct a highway, the road will often last long past its projected life.

Finally, deterioration can be greatly accelerated by significantly increasing loads and the frequency of traffic movements, and because of adverse environmental conditions; usually, poor environmental situations combine with increased loads and increased traffic volume to bring about more rapid deterioration.

(2) The needs of the Federal-Aid Highway system versus the existing revenues coming into the Highway Trust Fund.

Mr. Chairman, we have testified before this Subcommittee on prior occasions about the financial needs of the Federal-Aid Highway system. Accordingly, we do not want to extend this hearing by repeating that testimony.

Rather, I would like to summarize our findings by stating that in the judgement of AASHTO, the Federal-Aid Highway program needs to be immediately increased to the level of $12 to $14 billion per year, with further increases to follow annually. We believe this is a conservative position, and that in fact to fully meet the realistic needs now existing on our Federal-Aid Highway system would require a program in the range of $16 to $18 billion, or twice the size of our present effort.

These needs of our Federal-Aid Highway system include the following:

1. Completion of our national system of Interstate and Defense Highways will require about $38 billion, over the next decade.
2. The new Interstate 4R program has a present need for funding in the $2 to $3 billion per year range, which should be increased if the work elements transferred to it from the old Interstate completion program by Congress in 1981 are taken into account.
3. To rehabilitate and rebuild America's bridges will require some $40 to $50 billion.
4. The level of support for our primary, secondary and urban highway systems must be increased from today's levels.

You have had provided to you by the Federal Highway Administration their estimate of the needs of our Federal-Aid Highway system. In addition, other organizations have produced their own national estimates of what is required. The one striking fact revealed by all the needs estimates is that there is general agreement on the scope of our needs among highway professionals.

Preparatory to this hearing, AASHTO requested member departments to provide short statements of the highway needs that exist in their states. A large number of those reports have been received, and we want to file copies with you. Accordingly, we are submitting with this testimony statements from the following member departments:

Alaska
Arkansas
Florida
Idaho
Illinois
Iowa
Louisiana
Maryland
Michigan
Minnesota
Mississippi
Missouri
Montana
New Mexico
New York
Ohio
Pennsylvania
South Dakota
Texas
Virginia
Washington
West Virginia
Wisconsin

Mr. Chairman, we hope these statements from our member departments will provide you and the Subcommittee with a more direct feel for our nation's highway needs. They were prepared by the officials directly responsible for meeting and solving our highway problems, and are in their own words. The following are a few examples selected from the statements.

- South Dakota has a sizeable backlog of Interstate 4R needs that totals $31.2 million, the details of the projects being contained in the statement; but this is dwarfed by the $548 million in other highway needs in the state, including $87.4 million for resurfacing, $379.6 million for grading and surfacing, and $81.5 million for structures.

- Wisconsin estimates the total annual need for its Federal-Aid Highways at $419.2 million, which compares with its 1982 apportionment of $118.3 million. Beyond this, the non-Federal state system has an annual need of some $200 million.

- Minnesota's scaled-down estimate, for projects which the public has deemed essential, totals $2.3 billion for the combined state highways sytems. Of this, the state projects an annual need for a $535 million Federal-Aid highway program, with $382 of that coming from the Federal level.

- The Federal-Aid highway system in New Mexico shows a need of $1.94 billion for the Interstate, primary and secondary programs. At the same time, the state needs some $362 million for rual roads and highways on the state system, and almost half of this is to be spent on unpaved roads.

- In order to meet traffic service level needs and structural highway and bridge needs over the next five years, Florida projects a need of some $942 million per year, above presently projected available federal and state aid.

- Ohio summarizes its needs in the 10 major Federal-Aid highway programs as exceeding $2.36 million through fiscal 1986.

Mr. Chairman, we hope you will review each of the attached statements. They reflect the very real concerns of worried public officials in our departments of highways and transportation, who generally have long since taken all the fat and some of the muscle out of their estimates of highway needs and are still faced with large funding shortages. Many of these officials echo the observation of B. K. Cooper, Chief Engineer of the Arkansas State Highway Commission, who states, "Without increased federal and local funding in the future, the highway transportation network in Arkansas will continue deteriorating at an ever increasing rate."

Mr. Chairman, the Policy Committee of AASHTO pointed up the need for increased funding in our Federal-Aid Highway program when it adopted our "A Program for America's Highways in the '80's," in November, 1980. We have provided copies of that document to this Subcommittee before, and I am submitting another copy with this testimony. The overall needs stated in that Program are essentially the same in 1982 as in 1980 - and they are still unmet.

(3) The allocation of highway costs among the various user classes.

As I stated earlier, Mr. Chairman, AASHTO is not prepared at this time to provide an official position on cost allocation issues. We will be pleased to provide you with that position after it has been developed and approved by our member departments.

For now, we would offer the following general observations and guidelines:

1. We strongly support the concept of financing our highway program with user fees.
2. User fees ought to be apportioned to the different user classes in a manner that is equitable, and which reflects the costs imposed on the highway system by the class.
3. The apportionment of user fees ought to be based on sound, recognized engineering principles that take into account axle weights and frequency of loading, so that all user classes are treated equitably.
4. Specific user fees ought to be designed in a manner such that they can be economically and fully collected, with a minimum of administrative cost.

(4) Proposals to change the structure of the highway user fees.

While AASHTO is not prepared to comment specifically at this hearing on the different proposals for changing the highway user fee structure at the Federal level, we expect that individual member departments will offer their observations.

Overall, we want to again mention our concern about choosing alternatives that offer a minimum of administrative problems and cost. In this respect, we have some concern about the administrative aspects of the proposal for a national ton-mileage tax to be collected on heavy trucks by the states. Our limited review of this option indicates that for many states the administrative problems with such a tax could be immense, unless the Federal government provides support and cooperation. While ton-mileage data might be readily obtainable from national over-the-road trucking companies, captive and independent operators and the operators of three-axle trucks could be difficult to work with. To be successful, the Federal statute enacting such a tax should include penalty provisions sufficient to assure voluntary compliance, as with our Federal income tax. While some states are now involved with a ton-mileage tax, we also believe the merits of a national collection system should be explored. Finally, attention needs to be given to the problem of how to attribute ton-mileage fees to the several states.

Mr. Chairman, before concluding this testimony, I would also like to provide the Subcommittee with another report, this one concerning the position of the states comprising the Western Associaion of State Highway and Transportation Officials on truck size and weight limits. The chief administrative officers of the WASHTO states adopted the attached statement in May, and in it they urge that standard semitrailer lengths be limited to 45 feet for reasons of safety in turning. Their concern is that any change in truck length not result in a configuration that will cause off tracking, because this would in turn create a safety problem and generate the need to redesign many highways at great cost. Changes in truck size and weight should be reflective of the Federal Cost Allocation Study.

With respect to the last point, AASHTO continues to hold that consideration of truck size and weight legislation by Congress should be coupled with the cost allocation issue. As I have noted earlier, there is clearly a relationship between axle weights and the frequency of loadings, and the deterioration rate of our highways. Thus, any consideration of changes in the Federal cost allocation approach to highway user fees should take into account impacts that would result from Federal truck weight and length legislation.

Mr. Chairman, I hope these comments prove useful to the Subcommittee. Again, we commend you for addressing these issues and providing leadership in the Congress. If there is any way in which I or AASHTO can be of assistance, do not hesitate to let us know.

STATE OF ALASKA

JAY S. HAMMOND, GOVERNOR

Department of Transportation and Public Facilities
OFFICE OF THE COMMISSIONER

Pouch Z
Juneau, Alaska, 99811
(Telex 45-328)
(907) 465-3900

August 2, 1982

Francis B. Francois
Executive Director
American Association of State Highway
and Transportation Official
444 N. Capitol Street, N.W., Suite 225
Washington, D.C. 20001

Dear Mr. Francois:

RE: July 16, 1982 request to support Senate hearings.

Enclosed please find Alaska's response to your request for a statement of specific needs in relation to the Federal-Aid Highway Program. We trust this information will be helpful in preparing for the upcoming Senate hearings. Our department doesn't mind the length of the Federal-Aid Highway Legislation bulletins and appreciates the in-depth treatment they bring to these important issues.

Sincerely,

Ron B Lund
Robert W. Ward for
Commissioner

Enclosure

AASHTO RESPONSE

Alaska's Federal-Aid Highway Program Needs

The State of Alaska's needs with respect to the Federal-Aid Highway Program can be summed up with the word FLEXIBILITY. The thrust of the President's new federalism proposal is simple: the individual states are ready to assume greater decision-making authority in administering the highway program within their respective states. Especially if federal apportionments continue to decline in real terms, the added burdens of these new responsibilities require that each State transportation department have the flexibility it needs to carry out its program.

The State of Alaska will support the Federal retention of control for the Interstate and Primary systems with the costs of building and rehabilitation funded out of the Highway Trust Fund. The use of grants which should also come out of the Trust Fund for programs of state and local interest can and should be transferred to the control of governments closer to home. Neither S. 2574 nor H.R. 6211 increases the level of funding for either the urban or secondary programs; given the impact of inflation, states must have added flexibility, such as proposed in the Senate bill, to administer these programs and direct these funds quickly to where the money is needed most. Few federal laws can accommodate the immense variation in State needs. As the farthest north state, we can vouch for the immense variations in local conditions such as geography, weather and terrain. Our State is ready and willing for the challenge of greater responsibilities.

Of particular concern to Alaska are the drastic and arbitrary changes in existing apportionment formulas. These formulas have helped to build the world's best highway system - their effectiveness in doing this job should not be dismissed lightly. Factors such as vehicle miles traveled (VMT) and the proposed fuel consumption are much more arbitrary figures. Alaska's data collection methods that lead to our statewide and system-specific VMT figures are currently under review by a consultant. As with our own State's data collection methods, these new apportionment factors require much greater amounts of study before they are put to work apportioning funds.

Looking towards the future an increase in trust fund revenues is definitely on the legislative horizon. However, even now most states can not spend all of their apportionments because of the obligational limitation. Between now and the end of the Federal fiscal year, the State of Alaska has $80 million in Federal-Aid Highway projects ready for obligation. However, Alaska is entitled to less than $20 million in obligational authority leaving $60 million in projects awaiting next year's distribution of obligational authority. Of this $60 million, over $37 million is proposed for expenditure on the Primary system, $8 million on Alaska's Interstate routes and $15 million on secondary road projects.

For the next few years, our department's Six-Year Transportation Improvement program, dated March, 1982, lays out a need for $544 million in federal funding assistance over the next six years. This figure is only part of the total requirement, however, because it does not include many projects already underway, Federal-Aid projects which have already received legislative authorization, minor projects too small to be included, or projects on the federal-aid system currently proposed for funding from other sources. The total dollar value of highway improvements outlined in the Six-Year Program was over $3 billion.

ARKANSAS
STATE HIGHWAY COMMISSION

JAMES A. BRANTAN, CHAIRMAN
CAMDEN 71701
PATSY L. THOMASSON
LITTLE ROCK 722
FESTUS H. MARTIN, JR.
FAYETTEVILLE 72701

DAVID SOLOMON, VICE CHAIRMAN
HELENA 72342
RAYMOND A. PRITCHETT
MAUMELLE 72118
B. K. COOPER
CHIEF ENGINEER

HENRY GRAY, DIRECTOR
P. O. BOX 2261
LITTLE ROCK, ARKANSAS
72203

July 26, 1982

Mr. Francis B. Francois
Executive Director
American Association of State
 Highway and Transportation Officials
Suite 225
444 North Capitol Street, N.W.
Washington, D. C. 20001

Dear Mr. Francois:

In response to your request of July 16, we are hereby furnishing material excerpted from a recent highway needs study conducted in April, 1981, along with recent structure inventory data. The costs shown represent 1980 dollars, the state highway condition information was collected in mid-1980 and the structure data was compiled in July, 1982.

As can be seen from Figure 17, Arkansas needs an additional $92 million per year just to preserve the existing system without any type of major improvements. At this time we have only enough State funds to match federal aid during the coming fiscal year. With the recent ceilings imposed on the amount of federal funds available for obligation our system is deteriorating rapidly. Without increased federal and local funding in the future, the highway transportation network in Arkansas will continue deteriorating at an ever increasing rate.

If we may provide further information on this important subject, please let us know.

Sincerely yours,

B. K. Cooper

B. K. Cooper
Chief Engineer

Enclosure

Costs

With the results of the roadway and bridge inventories described earlier and with the design that is needed for that section to bring it up to standards, it is fairly easy through the computer to determine if the section meets the standards. If not, then the cost of construction to bring it up to standards can be applied.

This has been done for every section of Arkansas highway. The results are shown in the Highway Construction Needs chart as Immediate & Accruing Needs. The total backlog needs for bringing Arkansas highways up to standard is $5,015,200,000. (See Figure 6).

This would be the cost of all the new locations, major and minor widening, reconstruction, resurfacing, shoulder work, bridge replacement and rehabilitation and traffic controls (signals, railroad crossing signals, striping, signing) that would be needed to bring the 16,091-mile State Highway System up to standard.

While very desirable, realistically, funds simply will never be available to reach this goal. With this knowledge, it seems appropriate to look at more realistic goals. Therefore, two additional columns are shown in Figure 6. These are shown as Annual Improved System and Annual Preservation System. First, under the Preservation System the goal would be to keep everything status quo. In other words, only enough miles of highway would be resurfaced or reconstructed to not allow any more miles than presently exist to be in poor or intolerable condition, and only enough bridges would be reconstructed or rehabilitated to not allow the number classified deficient to increase. Nothing would be done to improve those sections that are functionally obsolete, no two-lane sections would be improved to four lanes, no sections would be widened, and no additional gravel roads would be paved. Spread over ten years, the cost to preserve the System status quo would be $153.6 million per year.

The Improved System would be the cost of the Preservation System, with some critically needed improvements added. Improvements added are:

(1) Replace Springbank, Jacksonport, Moro and Guion Ferries.

(2) Widen 2,167 miles of highway that is presently under 20 feet.

(3) Replace or rehabilitate 10% of the inadequate bridges per year.

(4) Pave 250 miles of critical farm-to-market roads that are presently gravel.

(5) Continue a number of projects that are underway or planned which provide vital links to population centers and are vital links in the transportation system.

    a. Highway 71 from Fayetteville to Bella Vista,
    b. Highway 63 from Marked Tree to Jonesboro,
    c. Highway 67 from Bald Knob to Newport,
    d. North-Belt Freeway (North Little Rock),
    e. Bartholomew Freeway (Pine Bluff)(Hwy. 65 - Hwy. 79),
    f. Highway 245 (Texarkana),
    g. East-West Arterial Route (Hot Springs),
    h. I-40 - Greenbrier (Hwy. 65),
    i. Highway 25 Relocation (Heber Springs),
    j. Highway 62 Relocation (Mountain Home),
    k. Hope Bypass (Hwys. 4 and 29), and
    l. Highway 4 Bypass (Warren).

(6) Provide some of the critical traffic operation items that are absolutely needed to safely operate the System.

This Improved System will cost $268.1 million annually, in 1981 costs. An obvious question might be, "What will happen if the money is not provided to at least preserve the System?" (See Figure 7.)

As Figure 7 shows, putting off critically needed work makes the effort cost significantly more in the future. Looking at the rural primary curve, putting off a thin overlay that might cost $60,000 per mile for four years would increase the cost to get the section back in shape to $400,000 per mile.

Of even more significance from Departmental analysis of the System, if the preservation investment is not made, in ten years much of our Interstate System and Primary System will have become so deteriorated that speeds of 30 mph will be common and the chuckholes and distortions in the pavement will make travel very unsafe. It also appears that perhaps 50% of the Secondary System will have returned to gravel or be in the stage of returning to gravel.

STATE HWY. CONDITION

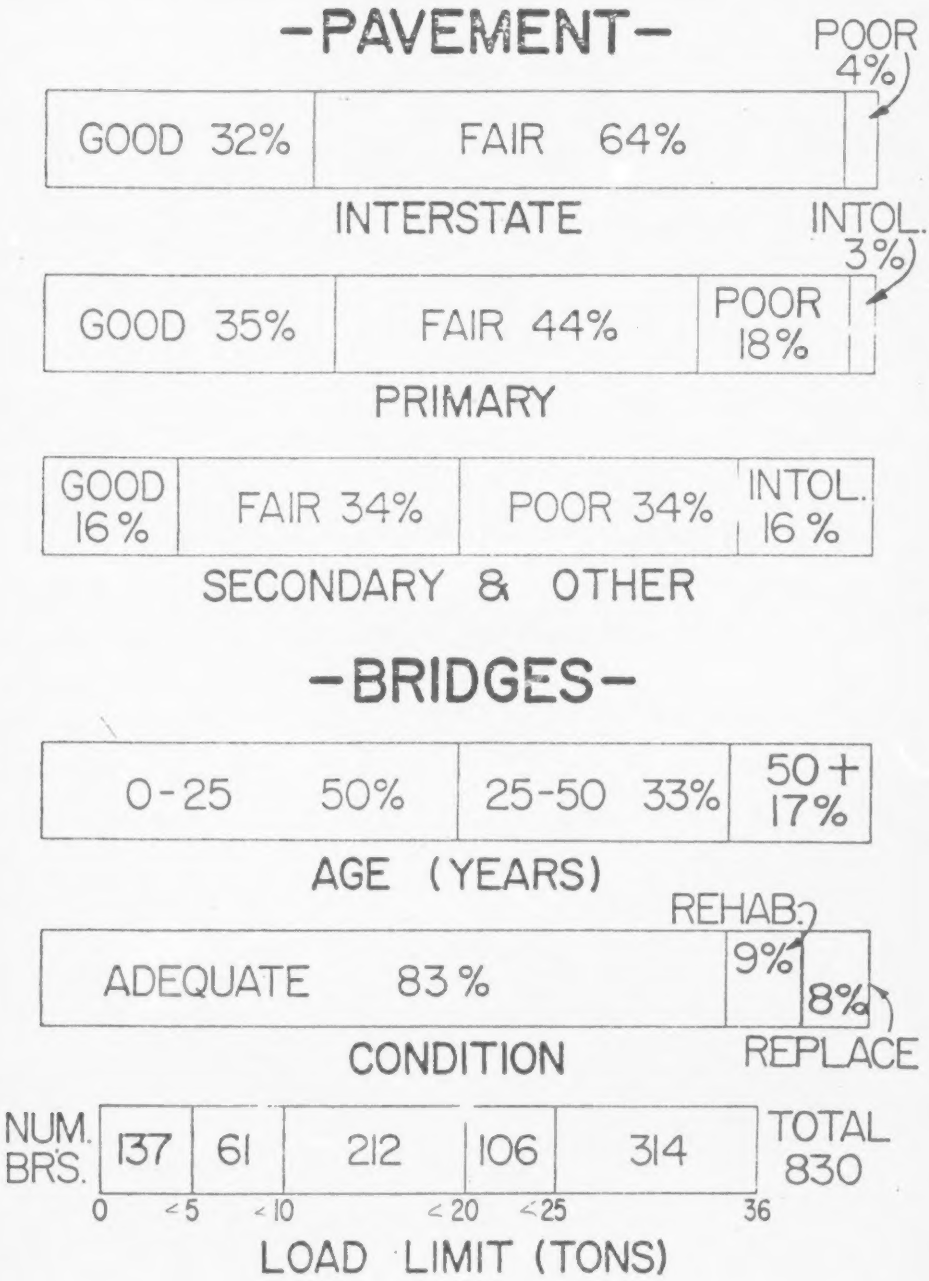


Figure 6

HIGHWAY CONSTRUCTION NEEDS

(COSTS X $1,000,000)

	IMMEDIATE NEEDS AND ACCRUING		ANNUAL IMPROVED SYSTEM		ANNUAL PRESERVATION SYSTEM	
	ROADWAY	BRIDGES	ROADWAY	BRIDGES	ROADWAY	BRIDGES
INTERSTATE	959.3	62.7	68.7	4.2	68.7	4.2
PRIMARY	2143.9	228.6	71.6	9.1	17.1	4.5
OTHER	1319.2	301.5	103.5	11.0	54.3	4.8
SUBTOTAL	4422.4	592.8	243.8	24.3	140.1	13.5
TOTAL	5015.2		268.1		153.6	

ANNUAL HIGHWAY NEEDS & REVENUES

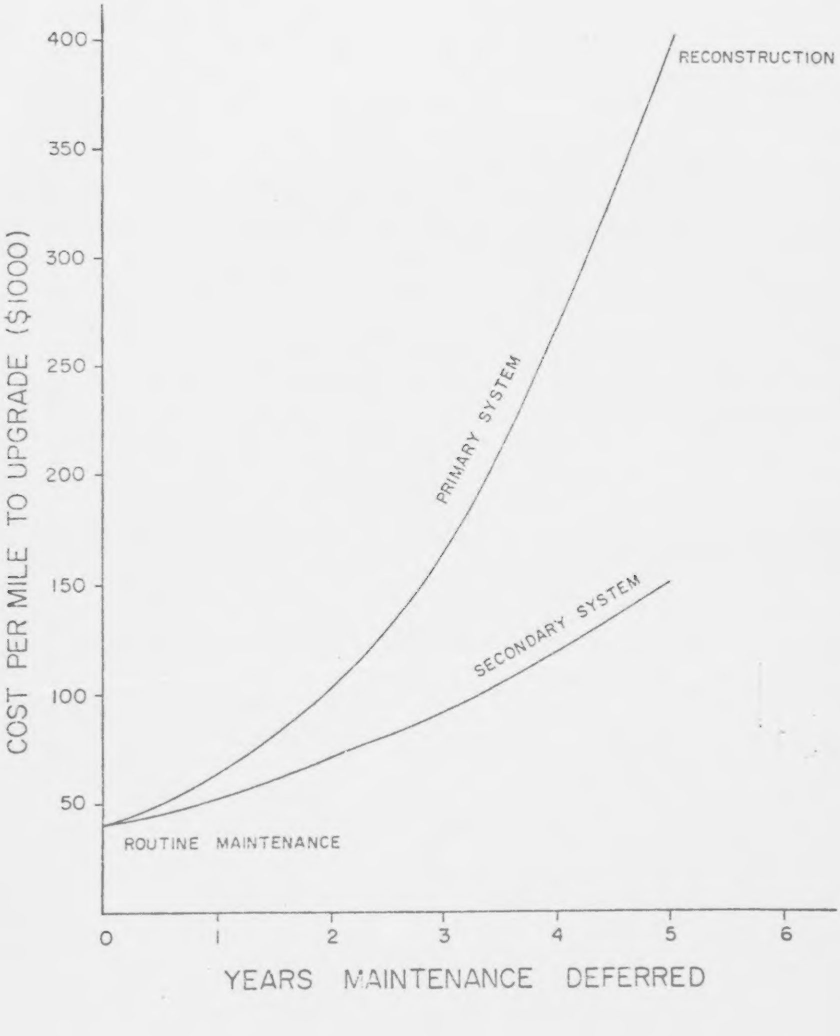
(COSTS × $1,000,000)

	NEEDS		EST. STATE REVENUES	EST. F.A. AVAILABLE	NET DEFICIT
	CONSTRUCTION	FIXED EXPENSES*			
R.J. HANSEN & ASSOC. (1978)	480.3	87.3	162.6	74.8	330.2
IMMEDIATE NEEDS (annualized over 10 years)	501.5	123.0	125.0	60.0	439.5
IMPROVED SYSTEM	268.1	123.0	125.0	60.0	206.1
PRESERVATION OF EXISTING SYSTEM	153.6	123.0	125.0	60.0	91.6

*FIXED EXPENSES: MAINTENANCE, ADMINISTRATION, OPERATIONS, CONSTRUCTION, SUPERVISION, OUTSTANDING OBLIGATIONS.

Figure 7

DEFERRED MAINTENANCE COST



TOTAL NUMBER OF STRUCTURES BY OWNER

	State	County	City	Other	Total
Total	6,743	7,180	492	248	14,663
On Federal-Aid System	4,535	753	422	3	5,713
Off Federal-Aid System	2,208	6,427	70	245	8,950

DEFICIENT STRUCTURES BY OWNER

	State	County	City	Other	Total
Total Deficient	1,765	5,755	251	175	7,771
On Federal-Aid System	1,084	437	223	2	1,744
Off Federal-Aid System	681	5,318	28	173	6,027

STATE HIGHWAY STRUCTURES BY FEDERAL-AID SYSTEM

	Total	Total Deficient
Interstate	625	115
Primary	2,376	576
Secondary	1,368	356
Urban	166	37
Total	4,535	1,084

GOVERNMENT OF THE DISTRICT OF COLUMBIA
DEPARTMENT OF TRANSPORTATION
415 12TH STREET, N. W.
ROOM 508
WASHINGTON, D. C. 20004

DIRECTOR OF TRANSPORTATION

AUG 12 1982

Mr. Francis B. Francois, Executive Director
American Association of State Highway and
Transportation Officials
444 North Capitol Street, N.W.
Suite 225
Washington, D.C. 20001

Dear ~~Mr. Francois~~ Frank:

In response to your recent letter dated July 16, 1982 please find enclosed two copies of a brief statement on the following:

a) Legislative Issues of Importance to the D.C. Transportation Program;

b) Statement Before the Transportation Subcommittee of the Senate Appropriations Committee.

Sincerely,

Tom Downs
Thomas M. Downs
Director

Enclosure

Legislative Issues of Importance to D.C. Transportation Program

Road and Traffic Operations

1. Interstate Program

The elimination of the half-percent minimum apportionment for both the Interstate and Interstate 4R programs would severely reduce D.C.'s funding level. The effect on the level of Interstate would not be felt until 1984, but the 4R program would drop from $3.9 million this year to $500 thousand next year. D.C. strongly opposes this change as being punitive toward small states such as District, Vermont and Delaware.

2. Interstate Substitution

We anticipate a need for $48 million and $46 million in FY 1984 and '85 respectively, or a total of $154.1 million in D.C. projects (non-WMATA) during FY 1982 to FY 1985.

D.C. would support a more structured Interstate Substitution program where Substitution entitlements were reflected in a formula with the percentage allocated to any jurisdiction based on the proportion the jurisdiction's unspent withdrawal represented of total withdrawal entitlement nationwide.

3. Primary Program

D.C. is the only highway program recipient who does not receive the minimum one-half percent apportionment. In FY 1982, that distinction cost D.C. $5.7 million dollars. Both the Senate Environment and Public Works Committee and the Administration have proposed to change this provision to enable D.C. to be a full participant in the program.

We support proposal to eliminate the clause: "(other than the District of Columbia)" now contained in 23 USC 104 (b)(1) with House Public Works and Transportation Committee.

4. Urban Program

The Administration has proposed only $395 million for the Federal-Aid Urban Program in FY 1983. The 1982 level was $800 million. They also propose to leave the program unfunded in FY 1984. D.C. received $3.9 million in FY 1982 for road and traffic improvements from this program, at the $395 million level less than $1.9 million will be received.

We seek authorizing Committees support of 1982 funding level at a minimum in FY 1983 and continuation of the program at that level for the life of the bill.

5. Bridge Program

The authorizing committees and the Administration are considering changes to the Bridge program (23 USC 144) formula that could mean a loss of million of dollars to the District at a time when a full bridge reconstruction program is underway here. The Administration wants to divide the program into four separate categories when calculating the funds. The Senate favors changing the current basis of fund apportionment - unit price costs for each recipient - to the national average unit price.

D.C. supports retention of current program structure, both the formula favoring unit price and the four year lapsing provision. On the latter, the District will be using all bridge funds each year for the forseeable future, so our opposition is general concern for program integrity and not for D.C.'s own program.

Transit Programs

1. Stark-Harris funding

The Administration proposes to begin using the Stark-Harris authority this year at only $100 million, while WMATA has proposed a $375 million METROrail program. The District seeks a full authorization for WMATA under the Stark-Harris Act. The law contains no escalation clause, so to approve only minimal funds under this authority each year is to reduce the value of these funds to WMATA's rail program.

2. Small-Bus Program

For more than three years, the District has worked to develop a small bus program to link neighborhoods to neighborhood commercial areas, to rail stations and major bus routes. The District intends to seek $5 million in Substitution funds for the final element of this program.

Statement Before The
Transportation Subcommittee
# of the
Senate Appropriations Committee

by

Thomas M. Downs
Director

District of Columbia
Department of Transportation

April 30, 1982

Mr. Chairman, members of the Subcommittee, I am Thomas Downs, Director of the District of Columbia, Department of Transportation and a member of the Washington Metropolitan Area Transit Authority Board. I appreciate the opportunity to appear before you today to discuss appropriations for federal transportation programs and their effect on one jurisdiction--the Nation's Capital. As the District has no voting representative in Congress, this opportunity to enlist your support for essential transportation programs is particularly welcome and needed.

Transportation Issues

The District is a small jurisdiction, but its population is equal to or greater than five States. The District maintains a road network consisting of 12 miles of Interstate highway, more than 1,000 miles of streets and roads, 2,080 miles of alley and sidewalk, and more than 250 bridge structures. Two thirds of these bridges are on the arterial and freeway systems. Currently, 23.7 miles of subway are operating in the District with another 14.4 miles planned to be opened by 1990. The transit system operates a fleet of 1,700 buses.

In the District we are fortunate in that the subway system is new and--with your help--expanding. Unlike other eastern cities, the concern with the subway system is not its condition, but whether or not sufficient funds will be available to ensure completion of the system in a timely manner.

The condition of our roads and bridges as well as our sewer and water system is a different matter altogether. Like many other urban centers, these basic capital systems are in serious need of repair and replacement. In the case of roads and bridges, the focus of my comments today, deterioration has been well ahead of repair for most of the last decade.

A study by the Federal City Council in 1980 identified a need to resurface 35 miles of streets each year to maintain a reasonable level of road service. This need is based on an expected life cycle for pavement of 25 years on arterials and 40 years on local streets. Between FY 1975 and FY 1980 the rate of resurfacing was approximately half that amount; during several years the rate of repaving of arterials was less than a fourth of the life-cycle goal.

The condition of District bridges poses an even greater problem. Bridge structures tend to deteriorate more rapidly due to weather and salting and the cost of repair is considerably higher. A 1980 survey of bridge condition indicated a need to reconstruct or replace 38 bridges between 1981 and 1996. The Federal City Council study indicated that major repair work was needed in the 1980's on an additional dozen bridges to overcome a decade of deferred maintenance.

The results of deferred maintenance and capital improvements can be measured in two important ways: public satisfaction and increasing potholes.

A recent poll by American University showed D.C. residents generally more satisfied with public services than they were in 1974 and 1976--except for street maintenance, where satisfaction has declined from almost 40 percent eight years ago to 24 percent today. At the same time satisfaction with police, fire, garbage collection, schools, and--I am pleased to note--transit has increased.

At the same time that citizen satisfaction with city streets was declining, the District's pothole budget was increasing. This winter the District was forced to request an additional one million dollars to handle the pothole problem. This is a poor use of limited funds, but we will continue to experience this problem until the backlog of street and bridge repairs is overcome.

Current Effort

As a result of the studies I have mentioned and our experience with a growing pothole problem, the District began in 1980 to expand the road capital improvement program. Moving from a local share of $6.3 million in FY 1979 to $12.9 in 1980, $15.5 million in 1981, and $29.8 million this fiscal year, the District has clearly demonstrated the local commitment.

Unfortunately, shortly after we came to grips with the road and bridge problem, federal funding became much more difficult to obtain for both transit and highway programs. We have gone, then, in a period of two years from a jurisdiction that turned back millions of federal highway dollars each year to one that is now short by more than $15 million in meeting its 1982 program.

Federal Resources

Our problem in the coming fiscal year will be acute if the Administration's proposed FY 1983 budget levels are enacted for the Primary, Bridge Replacement, and Urban programs. The difference to the District between FY 1981 and FY 1983 would be $6.2 million fewer federal dollars--more than a 34 percent reduction. The elimination of the Urban program in FY 1984 would put the District's road program back where it was four years ago, even though the level of local funds would be much higher.

And, while we welcome the new Interstate 4R Program, the level in FY 1983 and '84 ($800 million nationally) results in about half as much to the District as is needed to repair and reconstruct the Interstate routes. Truck traffic that is heavier than anticipated and the large amount of elevated freeway and tunnels, which are more expensive to repair, combine to produce a costly maintenance problem for the District's Interstate System. Proposed resurfacing of a portion of the S.E./S.W. freeway (I-295), for example, is estimated to cost more than twice the 4R apportionment for 1984.

One other program, which the District has been counting on since 1976 to fund major improvements, is the Interstate Substitution program. During the last six years the District has spent almost two billion dollars of Interstate Substitution funds on Metrorail construction and approximately $27 million on highway improvements.

As indicated in Table 1 submitted with my written testimony, the District intends to spend an additional $147 million in Substitution funds for critical road, bridge and traffic operation improvements in FY 1983-1986. Our 1983 capital budget requires more than $53 million in Substitution funds. Without these funds we will not be able to begin implementation of our new signal program, we will be $5 million short of the amount needed for reconstruction of the George Mason bridge (the southbound structure), and we will be forced to resurface less than 10 miles of roads rather than the 35 miles needed to maintain pavement life. The backlog of 1982 projects not underway due to lack of federal funds will remain as a backlog.

Last year when the Substitution program for highways nationally was at a level of $288 million, the District received $7.1 million. You can imagine my concern--and that of DOT directors in other entitlement areas--over the proposed level of $150 million.

The national pipeline of highway projects and the impending deadline for Substitution projects to be underway in 1986, make this level unrealistic. Certainly, the message this sends to all of us still considering withdrawals is to reconsider. A non-essential segment may, in fact, be better than no project at all. I concur with the coalition of substitution states who are urging a reasonable time frame and annual funding level to complete Interstate Substitution projects - both highways and transit.

In light of your Committee's role in considering the WMATA budget, I would like to make one final point. The Administration's proposed 1983 budget for WMATA anticipates only $100 million in Stark-Harris funds in 1983. In view of the lack of substitution funds available for METRO from the three jurisdictions (See table 2) the $195 million in Substitution funds identified by the Administration is unrealistic. Entitlements remaining from the District and Maryland are approximately $75 million. What is needed in FY 1983 is approximately $300 million in Stark-Harris funds. The National Substitution program could then be reduced by $200 million, so that the effects on the National budget would be negligible.

To enact a budget for METRO based on such a high level of Substitution funds would mean no METROrail construction program in FY 1983. At the $175 million level, WMATA would only be able to purchase equipment, pay debt service and complete current contracts. The alternative is to increase funding from an account authorized solely for WMATA. I ask your consideration of this alternative. Two weeks ago, Secretary Lewis met with the METROboard chairman and myself and expressed a willingness to support such a funding shift, as illustrated in Tables 3 and 4.

In closing, I thank you for taking the time to listen to the problems of one jurisdiction. I am sure that other cities and States are facing similar problems. We all recognize that States and localities must assume a greater burden. The District for one has increased the level of its commitment to both the transit and highway improvement programs. The decline in federal transportation funds, however, is too rapid for us to assume and maintain a reasonable program. Our alternative, should federal funds continue to decline, is to allow further deterioration of the road and bridge system and the signal system that controls more than 1200 intersections.

I urge you to maintain the level of federal transportation funding at the current year's level while new sources of user revenue are considered. The Nation's Capital can ill afford another bout with deferred maintenance of our transportation systems. As in past years, we rely on your good will to consider the District's needs as we are without a Senator to speak for us directly.

Table 1

D.C. INTERSTATE SUBSTITUTION PROGRAM
(all figures as of 9/30/81)

WITHDRAWAL FUNDING SOURCE	FEDERAL FUNDS(millions)
1st Stage[I-70S(D1-D4),I-395(C8-C13)]	$ 399.4
2nd Stage[I-66(1.36-I-395)I-266(B1-B3)]	$ 470.9
3rd Stage[I-295(C3-C6,I-395(C4-C8)]	$ 658.9
4th Stage[I-695(0.12-1.38)]	$ 364.8
Subtotal	$1,894.0
4th Stage Pending[I-266(0.45-1.45)](two sections)	$ 243.3
TOTAL VALUE OF INTERSTATE WITHDRAWALS TO DATE	$2,137.3
SUBSTITUTE PROJECTS	
D.C. Road and Local Transit Projects Funded	$ 20.1
Metrorail Construction Funded	$1,686.3
TOTAL	$1.706.4
BALANCE REMAINING	
Current	$ 187.6
Pending - I-266(0.45-0.96)	$ 128.9
I-266(0.96-1.45)	$ 114.4
TOTAL	$ 430.9
POSSIBLE ADDITIONAL WITHDRAWAL	
I-66, Section 1.11	$ 12.5
TOTAL AMOUNT POTENTIALLY AVAILABLE	$ 443.4
ESTIMATED COMMITMENTS	
FY 82 & 83 Metrorail Construction	$ 289.4 2x3
FY 82 - 85 D.C. Projects	$ 154.0
TOTAL D.C. COMMITMENTS OVER LIFE OF PROGRAM	
Metrorail Construction	$1,975.7
D.C. Road & Local Transit Projects	$ 174.1
TOTAL PROGRAM(Estimated)	$2,149.8

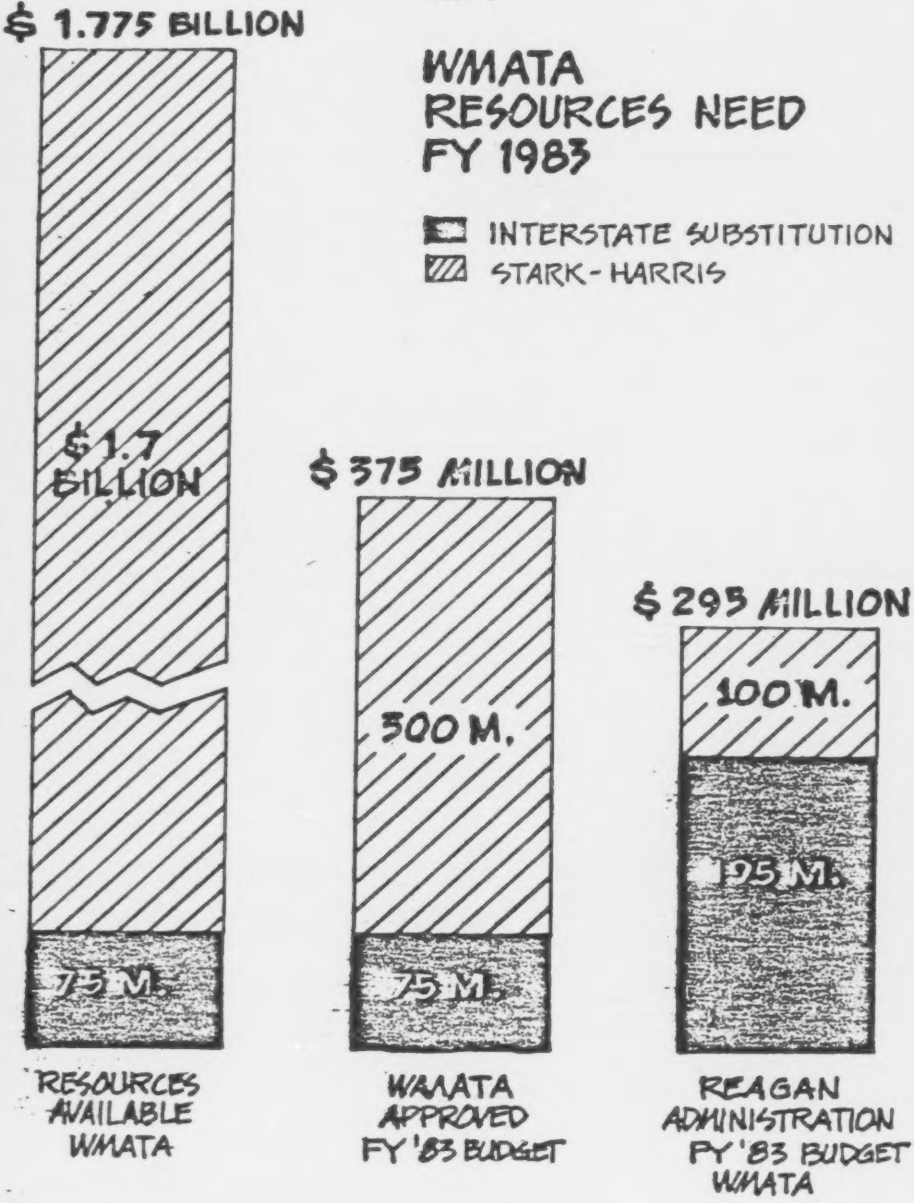
STATUS OF INTERSTATE SUBSTITUTION

D.C. AREA

District of Columbia	Federal Funds Millions
Withdrawals*	$2,150.4
Metrorail Through FY 82	$1,931.3
Local Projects	$ 174.1
Additional Metro	$ 45.0
Maryland	
Withdrawals*	$ 186.3
Metrorail Through FY 82	$ 119.3
Local Projects	$ 37.0
Additional Metro	$ 30.0
Virginia	
Withdrawals*	$ 76.7
Metrorail Through FY 82	51.7
Local Projects	25.0
Additional Metro	0.0

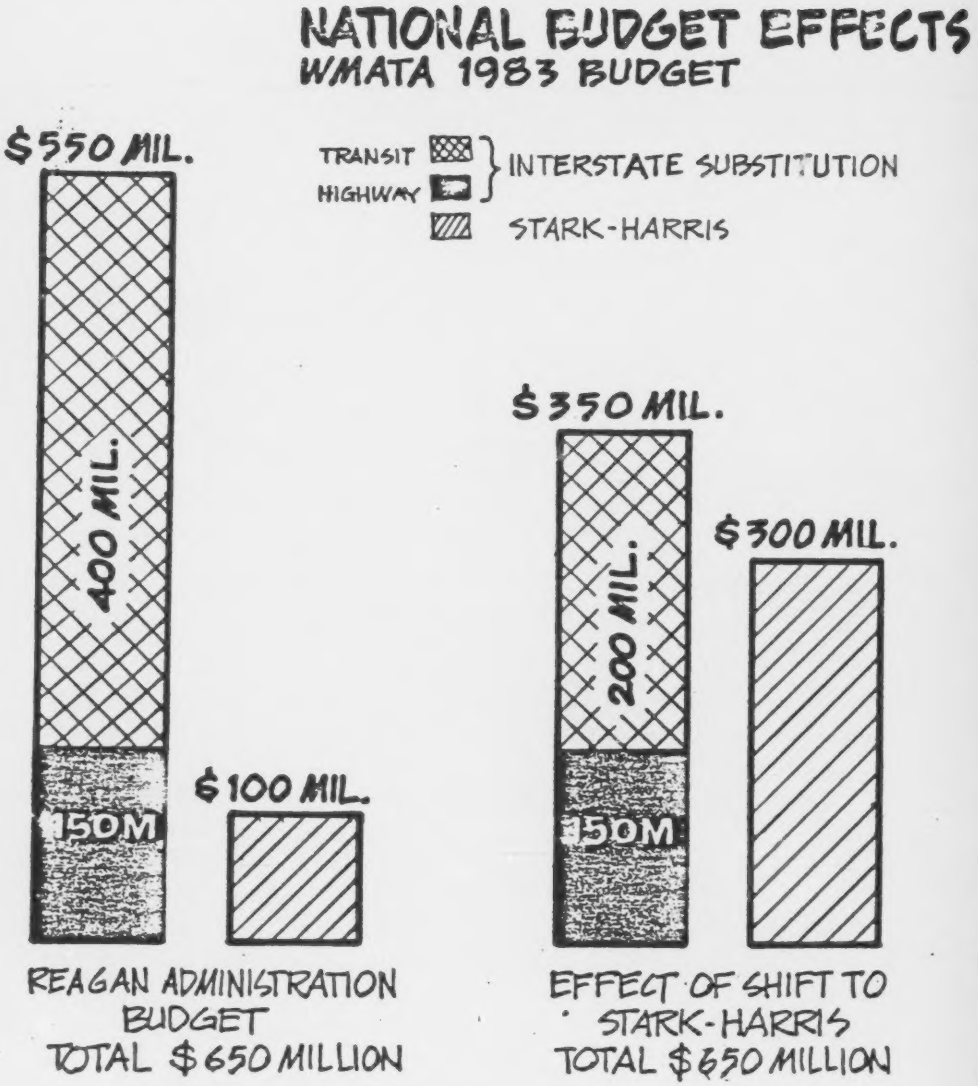
* Includes planned withdrawals I-370 in Md.
I-595 in Va.
I-266 in D.C.

Table 3



PREPARED BY D.C.DOT/OPPD / APRIL 1982

Table 4



PREPARED BY D.C. DOT/OPPD/APRIL 1982

Florida Department of Transportation

Haydon Burns Building 605 Suwannee Street Tallahassee Florida 32301-8064 Telephone (904) 488-8541

BOB GRAHAM
GOVERNOR

PAUL N. PAPPAS
SECRETARY

August 2, 1982

Mr. Francis B. Francois
Executive Director
American Association of State Highway
and Transportation Officials
Suite 225
444 North Capitol Street, Northwest
Washington, D.C. 20001

Dear Frank:

Subject: Highway Needs Data

The attached data is provided in accordance with your request of July 16, 1982 contained in your Bulletin No. 82-8 on the status of Federal aid highway legislation. Florida's non-Interstate highway needs are summarized on the following page. In addition, we will require about $300 million per year between now and 1990 to complete our Interstate system, that is, to let our last Interstate construction contract by that date. Supporting data to back up the attachment is contained in our report entitled "Florida's Transportation Choices for the Eighties," two copies of which are attached.

I am also enclosing three copies of "Florida's Highway Cost Allocation Study" for inclusion in your submittal to Congress at the appropriate time.

Sincerely,

Paul

Paul N. Pappas
Secretary of Transportation

PNP/pms
Attachments

SUMMARY OF NON-INTERSTATE FEDERAL-AID HIGHWAY PROGRAM NEEDS FROM "FLORIDA'S TRANSPORTATION CHOICES FOR THE EIGHTIES" REPORT

Additional * funding required for the next 5 years to meet traffic service level needs and structural highway and bridge needs are as follows:

Resurfacing:	$720 million
Bridge Replacement:	$560 million
Traffic Operations:	$130 million
Highway Improvements:	$3,300 million
TOTALS	$4,710 million, or $942 million per year

Approximately 85 percent of the amounts shown above would be applied to federal aid routes.

* These are funds required in addition to the present projection of federal and state funds anticipated to be available over the next 5 year period.

Florida Department of Transportation
Haydon Burns Building 605 Suwannee Street Tallahassee Florida 32301-8064 Telephone 904-488-454

BOB GRAHAM
GOVERNOR

PAUL N. PAPPAS
SECRETARY

August 3, 1982

Mr. John A. Clements
AASHTO President
New Hampshire Department of Public
Works and Highways
John O. Morton Building
85 Loudon Road
Concord, New Hampshire 03301

Dear Mr. Clements:

Subject: Federal Truck Size and Weight Legislation

The issue of Federal truck size and weight legislation, as was noted in AASHTO Bulletin No. 82-8, is of major importance to not only this Department but to the nation as a whole. While Senate Bill, S. 1402, and House Bill, H. R. 6211, both contain points that could be addressed at length, it appears that a basic statement on the overall issue would be more timely.

Initially, it is noted that the most basic function of transportation is to move people and goods. Ideally, each mode should be utilized to its fullest according to its unique capabilities and economies. However, the issue at hand constrains us to consideration of the highway mode and how best to obtain the optimum movement of cargo on the highway system. Time and the lack of adequate, relevant information prevent us from giving consideration of the other modes. Consequently, we recognize that ours is probably a very narrow view of the system as a whole. Furthermore, we recognize that our optimizing of a part of the system may be at the expense of the system as a whole.

Within these limits, there can be only one legitimate objective for governmental transportation agencies, that being to provide the optimum system for moving goods over our highways. Further contained within that objective, as applies to the development of optimum truck size and weight limits, are four prime considerations: uniformity in laws and regulations, simplicity in implementation of these laws and regulations, reasonableness and consistency of enforcement of these laws and regulations, and a proper allocation of costs occasioned by the usage of the highway system. Failure to observe any of these can effectively defeat the overall effort.

Uniformity of laws and regulations across the country is demanded by overriding needs for economies and efficiencies in transportation. This is particularly true in light of pending revisions in State-Federal relations wherein we are in the process of realigning highway system responsiblities. By insisting that the Federal government retain funding responsibility for the Interstate and Federal-aid Primary systems, we are also acknowledging the importance of these routes to interstate commerce. Conversely, all other routes are essentially for intrastate commerce.

One application of this point deals with truck weights. While we may not know the optimum maximum weight for trucks, we can say that the heavier the truck, the more damage it does to roads. In that light, no well-rounded argument has yet evolved that supports an increase in the present maximum limit of 80,000 lbs. GVW.

Another application of this point is the recognition that trucks allowed to carry laods in excess of established limits (by grandfather clauses) are essentially intrastate vehicles. Except that they violate the laws of other states, they remain within their home boundaries. Based on the previous discussion, the continued use of these grandfather clauses violates the general consideration of uniformity.

The principle of uniformity also argues against individual states establishing their own truck dimensional laws and regulations as apply to interstate commerce routes, i.e., the Interstate and Federal-aid Primary systems. Simplicity in implementation demands that the laws and regulations retained in this area be essential and valid. For example, the intra-axle length component of the Federal bridge formula is complex. Furthermore, it may require extensive shifting of loads during a single run to maintain acceptable load distribution. If this element of the formula cannot be demonstrated to be absolutely essential and cost effective, it should be amended to a more simple factor. One alternative would be to use the distance between the extreme of the external axles.

Reasonableness and consistency in enforcement are closely associated with the need for simplicity. In this area, two primary points are foremost: First, without adequate consistent enforcement, all other efforts relating to truck size and weight limits are worthless, and; second, the cost of fines resulting from enforcement activities must exceed the economic benefit to be gained by ignoring such enforcement activities. Failure to heed these two conditions is a primary contributing factor to the current widespread violation of weight laws.

A proper allocation of costs occasioned by users of the highway systems and an adjustment of user charges to reflect those costs is, in the overall perspective, the most important element in this discussion. It is obvious that even if each of the first three points are accepted, highway construction and repair costs will continue; if those points are ignored, such costs will soar. In this matter, two observations are important. First, the GAO, in 1979, concluded that: "Heavy and overweight trucks are a major cause of highway deterioration." Second, the FHWA in its recently released report on highway cost allocation, tended to confirm the GAO's original finding but noted that: "Heavy combination trucks significantly underpay" while lighter combinations and single trucks significantly overpay relative to highway user charges paid by other vehicles.

Based on the foregoing, the following conclusions become apparent regarding proposed modifications to Federal truck size and weight limits:

* No modification to such limits can be justified until the matter of highway cost allocation is fully debated and highway user charges are balanced accordingly.

* Consistency demands that Federal and State laws and regulations in this field be uniform. This need for consistency further highlights the inconsistency of allowing related grandfather clauses to continue; at best, they should be allowed to remain no more than a specific number of years before being terminated.

* Simplicity should be interwoven into these matters; anything less cannot be justified. As a first step, the inter-axle length component of the Federal bridge formula is an appropriate element to review for simplifying enforcement.

* Without adequate, effective enforcement, all these efforts are worthless.

Sincerely,

Paul N. Pappas
Secretary

PNP/mhs

cc:✓Mr. Francis B. Francois
Mr. B. K. Cooper

STATE OF IDAHO

JOHN V EVANS
GOVERNOR
IDAHO TRANSPORTATION BOARD
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ROY I STROSCHEIN - MEMBER
DARRELL V MANNING
DIRECTOR

TRANSPORTATION DEPARTMENT

P.O. BOX 7129
BOISE, IDAHO 83707

July 29, 1982

Francis B. Francois
Executive Director
AASHTO
444 N. Capitol St. N.W.
Suite 225
Washington D.C. 20001

RE: Status of Federal Aid Highway Legislation - Bulletin #82-8, dated July 16, 1982.

Dear Francis:

Attached is Idaho's statement of Needs and Summary of the State's Needs Study for the State Highway System. The County and Urban Federal-Aid System Needs are roughly equivalent to the State's Federal-Aid System Needs, i.e. FAS, Urban, Critical Bridges, HES and Railroad Crossings. The FHWA Highway Needs Model has been used to determine needs on 100 percent of the State Highway System.

The conservative ten-year needs is 1.85 billion compared to authorizations of approximately $540 million. These figures include all work to bring the systems up to adequate levels of condition and performance for the different classes of highway and traffic volumes.

Sincerely,

Darrell V Manning

DARRELL V MANNING
Director

DVM/cb

SAFE TRANSPORTATION MEANS PROGRESS
EQUAL OPPORTUNITY EMPLOYER

TEN-YEAR NEEDS SUMMARY

Presently, the State Highway System is made up of almost 5,000 miles or 11,250 lane-miles of highways and streets. The total estimated needs on the State Highway System amount ot $1.41 billion over the next 10 years or $141 million annually. This figure includes all work to bring the system up to adequate levels of condition and performance for the different classes of highways and traffic volumes.

STATE HIGHWAY NEEDS ESTIMATE
(Millions of Dollars)

	10-Year Needs Cost
Interstate	$ 246
Primary	653
Seconday	113
Urban	131
Critical Bridges	187
Traffic Signals, Railroad Protection Devices and Safety Improvements	77
	$ 1,407m ($1.41 billion)

TYPES OF IMPROVEMENTS NEEDED
(Millions of Dollars)

New Construction	$ 213
Reconstruction	740
Resurfacing with/without Shoulder Improvements	190
Bridge Replacement and Rehabilitation	187
Traffic Operations, Railroad and Safety Improvements	77
	$ 1,407m ($1.41 billion)

COUNTY AND URBAN FEDERAL-AID SYSTEMS ROADS AND STREETS NEEDS ESTIMATE
(Millions of Dollars)

Secondary	$ 113
Urban	131
Critical Bridges	105
Traffic Signals, Railroad Protection Devices and Safety Improvements	77
	$ 426m

Illinois Department of Transportation
Office of the Secretary
2300 South Dirksen Parkway/Springfield, Illinois/62764
Telephone 217/782-5597

August 2, 1982

Mr. Francis B. Francois
Executive Director
American Association of
State Highway and Transportation Officials
444 N. Capitol Street, N.W.
Suite 225
Washington, D.C. 20001

Dear Mr. Francois:

This is in response to the Federal-Aid Highway Legislation Bulletin #82-8, in which you requested a statement of state highway needs. Enclosed is a summary of the backlog and accruing state highway needs in Illinois, which was recently updated.

I hope this information will be useful. Please contact Mr. Gene McCormick, Chief of the Bureau of Statewide Program Planning at (217) 782-2755, if you have any questions.

Sincerely,

John D. Kramer

John D. Kramer

ILLINOIS DEPARTMENT OF TRANSPORTATION
BACKLOG AND ACCRUING STATE HIGHWAY NEEDS SUMMARY
(Costs in Millions of 1981 Dollars)

	Backlog Needs		5-Year Accruing Needs	
Program Category	#/mi.	$	#/mi.	$
Interstate (Completion)	--	--	25	250
Interstate (4R)	174	225	255	175
Resurface - Rural	1,553	300	2,296	415
- Urban	700	240	1,346	455
Widen & Resurface - Rural	463	130	358	100
- Urban	47	20	62	40
Bridges	1,019	890	955	655
Major Construction	392	845	214	325
Intersection/Misc./Safety	1,100	495	350	150
Other Expansion	-	-	150	350
		3,145		2,940

7/28/82

Notes to IDOT Backlog and Accruing State Highway Needs Summary

1. Backlog needs assumes completion of the IDOT FY 82 Program.

2. Widen & Resurface assumes up to 6' widening with no increase in the number of lanes.

3. Bridge needs are rehabilitation or replacements.

4. Major construction needs includes projects to increase number of lanes, reconstruction of poor geometric or structural condition, relocation of existing roadway, completion of short gaps, and other similar improvements.

5. Intersection/Miscellaneous/Safety needs are usually spot type improvements which could include signal modernization, turn lanes and channelization at intersections.

6. Interstate completion needs are assumed accruing at the rate of anticipated Federal Interstate funding during the period. Routes include I-290 and I-255.

7. Other Expansion needs include only the most critical elements of new system development. Improvement types include construction of freeways, expressways or adding lanes to existing high volume routes.

[illegible]
AUGUST 10, 1982

FOR U.S. SENATE TRANSPORTATION SUBCOMMITTEE HEARINGS
AUGUST 10 AND 11, 1982

IOWA'S HIGHWAY NEEDS

Iowa finds itself in a situation of having achieved near-maturity in the development of its basic highway network. This has taken place largely in the past half century in two major eras:

- From 1925 to World War II--getting out of the mud.
- From 1955 to the present--constructing the Interstate System and expanding the paved portion of the remaining network.

A combination of federal, state, and local funds have been used to accomplish the current status. The federal role has been largest in the most heavily used portion of the network, the Primary System including the Interstate routes within that system. State and local funding has supported most of the remaining more local parts of the network.

A recent study of the 10,000-mile Iowa Primary System, most of which is also the Federal-Aid Primary System, revealed that in the next ten years more than 112 bridges of the 3,900 serving the system must be replaced or repaired annually and 488 miles of 10,000 miles of pavement replaced or rehabilitated annually. An additional annual sum in excess of $100 million is required for these primary roads, which serve nearly two of every three vehicle miles of travel.

In addition the Interstate completion cost will be $104 million, the ten-year Interstate 4-R cost will be $445 million, and the Interstate transfer cost will be $300 million.

Bridges continue to be a significant problem. The Federal Highway Administration's most recent bridge status report lists more than half of Iowa's 25,000 bridges serving the total 112,000-mile public road system as structurally deficient or functionally obsolete.

While the current needs of the total Iowa road network are significant, the most beneficial federal assistance continues to relate to the major arterial highways. Future programs adopted by Congress should be simplified through limitation of the scope of interest to the following basic areas:

1. The Interstate System:
   - Complete the remaining mileage either as proposed or through the transfer and substitution provisions.
   - Commit substantial funding to long-term preservation through the 4-R concept as conceived in the 1981 Federal-Aid Highway Act.
2. The Federal-Aid Primary System:
   - Remodel or rebuild this system much of which is still as built in the "get out of the mud" era using 1930s' geometric standards.

3. Any supplementary programs (bridges, safety, etc.) should be either avoided or limited to the Primary System.

4. The level of funding for the Trust Fund should be increased to offset the extreme loss of buying power of the last decade. The current 4-cent federal fuel tax has not been changed since 1959 and in terms of current buying power is now worth only 1 cent.

The concept of federalism has been effectively embodied in the highway program from its beginning in 1916. The proliferation of localized and specialty categories, particularly in the last dozen years, has diminished that concept. The restoration of federal interest to the Primary and Insterstate System will once again make this the model program it has been for many decades. Much has been said recently of the deterioration of the basic public works facilities of the United States. The highway system is certainly one of our most essential economic tools. It is imperative that Congress not delay in defining the limited but crucial federal role and taking the necessary steps to restructure and increase the user financed base.

Department of Transportation and Development
OFFICE OF HIGHWAYS
P. O. BOX 44245 CAPITOL STATION
BATON ROUGE, LA. 70804

PAUL J. HARDY
SECRETARY

NEIL L. WAGONER
ASSISTANT SECRETARY

DAVID C. TREEN
GOVERNOR

August 5, 1982

Mr. Francis B. Francois
Executive Director
American Association of State Highway
  and Transportation Officials
444 North Capitol Street, N. W., Suite 235
Washington, D. C.   20001

Dear Mr. Francois:

In response to your request for information regarding specific needs with respect to our Federal-Aid Highway program we are submitting the following summary. With the exception of the cost to complete the interstate system all needs are identified as "now". Based on our needs evaluation and cost estimates these are the funds that would be needed to correct existing deficiencies on federal-aid highways and bridges.

With best regards, I remain

Very truly yours,

NEIL L. WAGONER

JEE:sbb
Attachment

cc: Mr. Paul J. Hardy
    Mr. Ted Stockwell

FEDERAL-AID HIGHWAY PROGRAM
CONSTRUCTION AND RESURFACING NEEDS

	MILES	COST
Interstate Completion	227	$1,544,000,000
Interstate 4-R	130	50,100,000
Other Federal-Aid Primary	532	1,058,488,000
Federal-Aid Secondary	1,372	396,223,000
Subtotal	2,261	$3,048,811,000

BRIDGE REPLACEMENT & REHABILITATION

	STRUCTURES	COST
Federal Bridge Replacement	1,060	$350,000,000
Federal Bridge Rehabilitation	1,200	250,000,000
Subtotal	2,260	$600,000,000
Total Cost		$3,648,811,000

Maryland Department of Transportation
The Secretary's Office

Harry Hughes
Governor
Lowell K. Bridwell
Secretary

August 2, 1982

Mr. Francis B. Francois
Executive Director
American Association of State Highway
and Transportation Officials
444 North Capitol Street, N.W.
Suite 225
Washington, D.C. 20001

Dear Mr. Francois:

In response to the AASHTO request (CAO Bulletin #82-8 dated July 16, 1982), we are providing the following information concerning Maryland's priority highway needs.

1. Interstate

Interstate needs for federal funds in 1983 dollars total $2.3 billion. This includes costs for projects in Baltimore City as well as the remainder of the State. Maryland has one of the highest levels of interstate roadways yet to be completed. Under current definitions, Maryland's balance to complete its portion of the system amounts to almost 6.7 percent of the national total.

2. Interstate 4R

Interstate 4R needs for federal funds total $336 million in 1983 dollars. These figures have increased significantly due to the redefinition of the interstate system in the Federal-Aid Highway Act of 1981. This redefinition, as you know, limits eligibility of improvements associated with the interstate system, thereby placing many needed projects into the 4R category. In addition, the aging and deterioration of the existing interstate roadways in Maryland have added to our interstate 4R funding needs.

My telephone number is (301) 859-7333
Telephone TTY For The Deaf (301) 859-7227
Post Office Box 8755, Baltimore-Washington International Airport, Maryland 21240-0755

Mr. F.B. Francois
August 2, 1982
Page Two

3. Interstate Substitution

To carry out projects in the Interstate-70 withdrawal, a total of $70 million in federal funds has been requested for FY 1983. Of this amount, $60 million is designated for transit projects (Section B of the Baltimore Metro System), and $10 million for highway projects. Beyond FY 1983, adequate levels of funding are needed to complete the balance of the projects in the I-70 withdrawal. This balance totals approximately $130 million. If there were a likelihood of receiving adequate levels of funding for substituted highway and transit projects, the State might consider additional withdrawals prior to the statutory deadline for approved concept programs.

4. Major Bridges

Federal funds needed for major bridge projects total $539 million in 1982 dollars. This figure includes $335 million for bridges on State roads and $204 million for bridges on county roads.

The above numbers indicate Maryland's priority needs; we have selected those program areas where federal funding decisions will have the most impact on Maryland's highway system.

Also, attached for your use and/or transmittal to the appropriate Congressional committee are four copies of Maryland's Cost Allocation Study.

Sincerely,

Clyde E. Pyers, Director
Office of Transportation Planning

CEP/EKM/bc
Enclosures

cc: L.K. Bridwell
B. Wauchope
M.S. Caltrider
W.A. Hellmann
✓ D. Lee

TRANSPORTATION
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STATE OF MICHIGAN
WILLIAM G. MILLIKEN, GOVERNOR
DEPARTMENT OF TRANSPORTATION
TRANSPORTATION BUILDING, 425 WEST OTTAWA PHONE 517-373-2090
POST OFFICE BOX 30050, LANSING, MICHIGAN 48909
JOHN P. WOODFORD, DIRECTOR

August 2, 1982

Honorable Steven D. Symms
United States Senate
452 Russell Senate Office Building
Washington, D. C. 20510

Dear Senator Symms:

I have been advised by the American Association of State Highway and Transportation Officials that the Senate Transportation Subcommittee may hold hearings on August 10th and 11th, to discuss the deterioration of the nation's highways.

The attached statement summarizes Michigan's position and I respectfully request that it be included as a part of the testimony at the hearings.

Sincerely,

John Woodford

John P. Woodford
Director

JPW/GJM/PET/pb

cc: Senators Riegle
Levin
Representatives Albosta
Pursell
David Harrison, Gov's.
Washington Office
Francis B. Francois ✓
G. J. McCarthy
S. F. Cryderman

The State of Michigan is experiencing a severe decline in transportation revenue.

For 1982, the total dollars in Michigan's State Trunkline Fund are projected to be less than in 1975, while the construction cost index in Michigan has risen 43.3% and the cost to maintain state highways is up 117% from what it was in 1975.

In order to cope with decreasing revenue and to allow us to take advantage of the available Federal Aid, the Department has reduced its non-maintenance work force considerably. It has, for all practical purposes, eliminated the 100% State funded construction programs which, only a few years ago, were at the $50 million per year level and has opted for improvement alternatives which will require attention in a few years rather than desirable long-term improvements. Why? We simply have no money to spare and the funds must be placed where absolutely necessary. A good example of this is the work done on US-23, south of Flint, a four-lane freeway built in the mid 1950's that has reached its design life. The recommended solution was either to recycle the existing concrete pavement or remove and replace it. This would have cost approximately $1.5 million per mile. However, we only had funds for a thin bituminous resurfacing of the freeway. This is a temporary three to five year solution in lieu of the more permanent solution, which would have rendered US-23 relatively maintenance free for another 25-30 years. Poor economics? We simply had no choice.

We have also reduced our highway maintenance to the lowest levels in years and are looking at ways to further reduce it, such as less frequent roadside mowing, the closing of some roadside parks, postponement of non-essential repairs, etc.

Our highway needs, however, continue to mount. The bulk of our freeway network has reached a point where substantial improvement is needed in order to preserve the system, ironically at a time when our revenues are at their lowest point in many years. Our other highway systems are also deteriorating at a fast pace and unless relief is found, the cost to this state and local units of Government (Cities and County Road Commissions) is going to be unmeasureable in many areas. Cur economy will suffer, the public will suffer, and the damage to our highway system may be too expensive to reconstruct within the forseeable future.

The Michigan Department of Transportation urges the U. S. Congress to provide additional Federal Aid Highway Funds to halt the deterioration of our highways, with more equitable distribution formulas, reduced federal controls and a reduced matching share to enable us to take advantage of the increased funds. To delay the needed action will only postpone the problem and increase the costs to improve the nation's highway network.

MICHIGAN DEPARTMENT OF TRANSPORTATION

TRANSPORTATION
COMMISSION
HANNES MEYERS, JR
CARL V. PELLONPAA
WESTON E. VIVIAN
LAWRENCE C. PATRICK, JR
RODGER D. YOUNG
WILLIAM C. MARSHALL

STATE OF MICHIGAN
WILLIAM G. MILLIKEN, GOVERNOR
DEPARTMENT OF TRANSPORTATION
TRANSPORTATION BUILDING, 425 WEST OTTAWA PHONE 517-373-2090
POST OFFICE BOX 30050, LANSING, MICHIGAN 48909
JOHN P. WOODFORD, DIRECTOR

August 18, 1982

Francis B. Francois, Executive Director
American Association of State Highway
and Transportation Officials
444 North Capitol St., N.W., Suite 225
Washington, DC 20001

Dear Mr. Francois:

In response to AASHTO Bulletin #82-8 (Status of Federal-Aid Highway Legislation), I attach two documents. The first is a discussion of our Needs Study process. The second is a table of needs broken down by Federal-Aid system and type of improvement. Any questions you or your staff may have should be directed to Terry Gotts (517-373-9045) or Robert Scholle (517-373-2236) of the Transportation Planning Bureau.

Sincerely,

John P. Woodford
Director

Enclosure

MICHIGAN TRANSPORTATION NEEDS PROCESS

A 1977 Michigan Transportation Needs Study completed an inventory of all state and local roads. This inventory was appraised for deficiencies for the period 1977 through 1989. Improvements needed to correct these deficiencies were then costed. The attached tables show a recent summary of these improvement needs by federal-aid categories. The following paragraphs explain in more detail the needs process.

The network of roads and streets in Michigan is a tri-jurisdictional authority comprised of the Michigan Department of Transportation (MDOT), the County Road Association (CRA), and the Michigan Municipal League (MML). Each has authority over its own network of roads and each conducts an inventory of its own system. While the MDOT assumed the task of initially classifying the entire network of highways, roads, and streets, the CRA and the MML were asked to provide input and recommendations for reclassification of their road systems where necessary. A cooperative effort by state, county, and city road administrations resulted in identifying a statewide network of roads based upon jurisdictional classification.

A Transportation Needs Study Committee comprised of top representations from each of these agencies listed above reviewed and analyzed such things as the development of study goals, service level assumptions to be employed in the identification of needs, design standards representative of various classification of roads, appraisal methods used for determination of needs, and costs to be used for estimation of needs.

All inventoried road sections then were appraised and a determination was made as to the type and cost of improvement necessary, as well as the time frame of needed improvement. For each deficient section of road, total needs were determined by applying unit costs for each type of deficiency. Capital expenditure costs were developed for: (1) right-of-way, (2) grading and drainage, (3) base and surface, (4) structures, (5) railroad grade crossing protection, and (6) miscellaneous.

Capital expenditure needs were further categorized as: (1) backlog, (2) rehabilitation and restoration, and (3) service expansion. Backlog needs represent that portion of capital expenditure needs which exist immediately, and require immediate improvement if the funds were made available. Rehabilitation and restoration needs represent that portion of the capital expenditure needs associated with improvement of the existing roadway by resurfacing and for widening by less than one full 12' lane. Service expansion needs was further separated into two sub-categories - adding one or more full traffic lanes to increase capacity, and new roads on a completely new location.

The capital expanditure needs were summarized, and together with the operation and maintenance needs, they comprise the total needs of Michigan.

Michigan's needs were also analyzed according to federal-aid categories. The program used consisted of: (1) Interstate, (2) Federal-Aid Primary, (3) Federal-Aid Secondary, (4) Federal-Aid Urban, and (5) Non-Federal-Aid. These classifications are developed by the Michigan Department of Transportation in cooperation with the US Department of Transportation, Federal Highway Administration.

The enclosed table shows the breakdown of needs costs and miles by the various categories of capital expenditure and federal-aid classifications. Costs for routine maintenance and operations are not available by the federal-aid categories.

IMPROVEMENT NEEDS

The attached tables summarize the results of the 1977 Michigan Highway Needs Study relative to the types of improvement required within the several Federal-Aid systems as well as those roads and streets not on any Federal-Aid system.

The improvement types are divided into three broad categories.... Resurfacing, where the original road structure remains intact with only a surface added.... Reconstruction, where the original road structure is rebuilt.... and Widening, where the original road structure remains intact and additional lanes are added. The categories are further divided into "minor widening" (less than a lane) and "major widening" (widening of 12 feet or more).

Of the total highway mileage requiring improvement, about 39% requires resurfacing only. The bulk of resurfacing mileage occurs, as expected, in the non Federal-Aid mileage category. Sixty percent of the total improvement mileage requires reconstruction with 74% of the reconstructed mileage requiring additional widening. Only one percent of the total improvement mileage requires widening without additional reconstruction or resurfacing. Most of this type of improvement occurs in urban areas on the Federal-Aid urban system.

IMPROVEMENT NEEDS (MILES) - Roadway Miles

Federal-Aid System	RESURFACE			RECONSTRUCTION			WIDEN	TOTAL
	Only	+Minor Widen	+Major Widen	Only	+Minor Widen	+Major Widen	Only	
Interstate	1,206	0	104	216	0	428	180	2,134
FAP	3,040	1	206	908	1,266	1,317	113	6,851
FAU	1,701	20	331	57	986	1,271	449	4,815
FAS	9,049	3	36	1,287	8,057	473	26	18,931
Non-FA	29,371	26	60	15,523	37,191	621	51	82,843
Total	44,367	50	737	17,991	47,500	4,110	819	115,574

IMPROVEMENT NEEDS ($1,000's) - 1977 Dollars

Federal-Aid System	RESURFACE			RECONSTRUCTION			WIDEN	TOTAL
	Only	+Minor Widen	+Major Widen	Only	+Minor Widen	+Major Widen	Only	
Interstate	107,850	0	149,667	261,316	0	549,556	205,267	1,273,656
FAP	217,854	3,132	280,141	650,297	759,467	1,763,467	886,206	4,560,564
FAU	149,022	29,333	494,781	67,055	616,809	2,036,566	603,362	3,996,928
FAS	317,357	427	44,571	328,929	2,165,951	624,794	414,152	3,896,181
Non-FA	859,729	4,991	51,072	1,371,612	6,871,320	472,026	41,883	9,672,633
Total	1,651,812	37,883	1,020,232	2,679,209	10,413,547	5,446,409	2,150,870	23,399,962

Minnesota
Department of Transportation
Transportation Building
St. Paul, Minnesota 55155

Office of Commissioner
(612) 296-3000

July 30, 1982

Mr. Francis B. Francois
Executive Director
American Association of State Highway
  and Transportation Officials
444 North Capitol Street, N.W.
Suite 225
Washington, D.C. 20001

Dear Mr. Francois:

We would like to comment as follows in response to your July 16 letter invitation to (1) provide a statement of our specific needs with respect to federal-aid highway program funding and (2) comment on pending truck size and weight legislation.

1. Federal-Aid Highway Program Funding

   Minnesota is not currently utilizing a formal Highway Needs Study because of the vast disparity between our needs and funding capability (the needs to bring our trunk highways to AASHTO standards was estimated at $3.2 billion in a 1978 study). In connection with the development of our State Transportation Plan, we reduced our needs estimate to $2.3 billion by including only improvements which were perceived by the public to be necessary. Nevertheless, our needs remained high. The following is a conservative estimate in 1982 dollars of an annual program that would support our needs:

	$ Millions	
Program	Total Cost	Federal Funds
Interstate		
Completion ($611 million total)	$135	$120
4R	70	63
Substitution	48	40
Trunk Highway		
Major Projects	30)	-- 60 (FA Primary)
Reconstruction	50)	
Reconditioning	25)	
Resurfacing	30)	
Bridge Repair	12)	
Bridge Replacement		
Trunk Highway ($360 million total)	40	32
Local Roads ($450 million total)	20	16
Urban System		
Trunk Highway	20	15
Local Roads	15	11
Secondary System	20	15
Safety	20	10
TOTAL	$535	$382

2. Truck Width and Length

S. 1402 would supercede two laws presently in effect in Minnesota -- a 65 feet maximum length for twin trailers and the king-pin-to-rear-axle-limitation of 40 feet for 48 feet trailers. Although the change proposed by S. 1402 in terms of number of feet seems minimal when considering the Interstate system, the changes could have tremendous effects in urban areas and on federal-aid roads not designed to Interstate standards.

The bill would allow 65 foot twin trailers access to the Interstate and federal aid routes in Minnesota as designated by the transportation secretary. We support developing twin trailer access to the Interstate and federal aid routes to provide more efficient transportation, but we believe the State is in a better position to limit certain routes due to safety criteria such as limited sight distances than the Secretary of Transportation. The state transportation agency should designate routes where twin trailers are permitted.

The bill states that "no state may enact or enforce any law denying reasonable access to commercial motor vehicles subject to this act to and from the Interstate Highway System and the Federal Aid Primary System and terminals and facilities for food, fuel, repairs and rest." This section of the bill could very well be abused if interpreted wrongly. Demands could be placed on us to provide access to posted roads. Narrow bridges and turning movements on narrow or congested urban routes also could cause safety problems. Clarification of Section 5 is needed in the bill in order to provide clear interpretation or some other flexibility should be allowed the states in providing the access required by the bill.

Mn/DOT is opposed to S. 1402 as presently written.

Thank you for the opportunity to provide input for the upcoming Senate Transportation Subcommittee hearings.

Sincerely,

Richard P. Braun
Commissioner

Mississippi
State Highway Department
Jackson

John R. Tabb
Director

P.O. Box 1850
Zip Code 39205

August 3, 1982

Mr. Francis B. Francois, Executive Director
American Association of State Highway and Transportation
Officials
444 North Capitol Street, N.W.
Suite 225
Washington, D.C. 20001

Dear Mr. Francois:

In reference to your letter of July 16, 1982, we are enclosing a copy of our Highway Construction Needs.

Sincerely,

John R. Tabb

John R. Tabb
Director

JRT:vcw

Enclosure

MISSISSIPPI HIGHWAY CONSTRUCTION NEEDS

The Highway Department estimates there will be a total of $13,626 million to catch up with the backlog of needs and those expected to accrue during the next 20 years. These needs do not include spot safety improvement needs, Great River Road Construction, Appalachia Corridor Construction and Discretionary Projects that should be included into long range revenue plans and programs. Because of the recent emphasis on bridge inventories and analysis our suspicions of bridge deteriation have been quantified and is now a major element in the needs of this State and is given high priority in construction programs and schedules. Table 1 shows the 20 year construction needs costs for the State's highways, county roads, and city streets.

Mississippi recognizes it has a prominant role in constructing and maintaining its highways, roads and streets and to provide maximum funding at the State level toward this end. However, the amount of revenues the State can generate for this purpose falls quite short of financing the identified construction needs and, therefore, continued Federal assistance must be relied upon to achieve even a minimally acceptable highway and street network. Based on needs studies by the State, a minimum annual funding level is needed as shown below:

ROADWAY CONSTRUCTION PROGRAM

Highway Type	Annual Revenues
Interstate	$ 36,358,000
Interstate 4R	45,018,000
Primary	55,015,000
Secondary	28,916,000
Urban	13,205,000
TOTAL	$178,512,000

An accelerated program of replacing deficient bridges at both the State and local level must be undertaken at the earliest possible opportunity in order to assume continued movement of goods and products. Although funding at both the State and Federal level for bridge replacement has been initiated, it falls far short of the identified needs. In order to correct the deficient bridges in the next 20 years a minimum annual funding level for each highway type is shown below:

STRUCTURES CONSTRUCTION PROGRAM

Highway System	Annual Revenues
Primary	$13,543,000
Secondary	7,171,000
Urban	85,000
Local	13,243,000
TOTAL	$34,042,000

Safe highways continue to be an important goal of the State. The Categorical Highway Safety Program Funds has contributed greatly toward eliminating hazards at critical locations on highways and streets as well as railroad grade crossings. Accident reductions resulting from this program documents the need for a continuing safety improvement program. Federal funds specifically earmarked for the Safety Program should be continued to prevent competition between safety type improvements and capital improvements. The existing Federal funding level for the Safety Program seems to be at the appropriate level for Mississippi and, therefore, minimum annual revenues needed for this program is shown below:

HIGHWAY SAFETY PROGRAM

Program Type	Annual Revenues
Hazard Elimination	$3,000,000
Railroad Grade Crossing	3,300,000
TOTAL	$6,300,000

Occasionally the identified needs in the State consist of a particular project of great magnitude and importance at the regional or national level as well as within the State. Funding such projects at the State level would cause a virtual halt to a highway program for some time and cause the State to fall further behind in catching up with its deficiencies. Mississippi's topmost priority project is the improvement to Mississippi River Bridge between Natchez, Mississippi, and Vidalia, Louisiana. A discretionary fund for this improvement would benefit both Mississippi and Louisiana and is shown below.

DISCRETIONARY FUND PROGRAM

Project	Cost
Natchez River Bridge	$40,000,000

States designated for Discretionary Funds have been hampered toward utilizing these funds since this funding category is included in the authorization limitation placed on the states. In order for these funds to be used for the purpose intended and without impacting the entire highway program, the Discretionary Funds should be exempt from the annual obligation limitations placed on Federal Highway Construction Funds.

TABLE 1

HIGHWAY CONSTRUCTION NEEDS SUMMARY FOR NEXT 20 YEARS ($MILLIONS)

SYSTEM	ROADWAY	STRUCTURE	TOTAL
Interstate	$ 363.58	$	$ 363.58
4R	450.18		450.18
Primary	1,100.30	270.85	1,371.15
Secondary	578.32	143.41	721.73
Urban	264.09	1.70	265.79
Local	10,188.61	264.85	10,453.46
TOTAL	$12,945.08	$680.81	$13,625.89

DEPARTMENT OF HIGHWAYS

TED SCHWINDEN GOVERNOR
2701 PROSPECT
STATE OF MONTANA
HELENA MONTANA 59620

July 30, 1982

Mr. Francis B. Francois
Executive Director
American Association of State Highways
and Transportation Officials
444 N. Capitol Street N.W.
Suite 225
Washington, DC 20001

Dear Mr. Francois.

Pursuant to your request in your bulletin #82-8 (July 16, 1982), I have enclosed a brief summary of major highway improvement needs (expressed in dollar terms) for the State of Montana. Clearly, for a state of our size, the magnitude of need is substantial.

If we can be of any further assistance, please don't hesitate to contact me.

Sincerely,

Gary J. Wick

Gary J. Wicks
Director of Highways

GJW:SH:dj:5F

Enclosure

cc: Honorable Max Baucus
Honorable John Melcher
Honorable Pat Williams

AN EQUAL OPPORTUNITY EMPLOYER

MONTANA DEPARTMENT OF HIGHWAYS

SUMMARY OF NEEDS ON FEDERAL-AID HIGHWAY SYSTEM

The Montana Department of Highways is currently in the process of updating its Needs Analysis of the state's Federal-Aid Systems. The following figures, therefore, constitute a preliminary estimate of that need. A final report providing supporting documentation will be available this fall.

The needs addressed below are those required to bring the Federal-Aid Primary and Secondary systems up to full design standards. The Primary analysis considers only mileage rated 60 or below on a 100% sufficiency scale. Interstate needs are those required to close "gap" sections. Bridge needs are based on bridge sufficiency data. Urban needs are an estimate based on areas with transportation plans. These figures do not reflect recurring or cyclic needs for seal coat/overlay pavement management measures.

SYSTEM	NEEDS (In $ Millions)
Interstate	$ 146
Primary	1,095
Secondary	1,025
Urban	194
Bridges (On System)	135
Total	$ 2,595

The large need on the Primary System is due largely to the fact that the system is 20 or more years old (see attachment 1). The similar magnitude of need on the Secor a function of the extensive unpaved and old-paved mileage.

JBB:dj:206R

ATTACHMENT #1

MONTANA

MILES OF RURAL PRIMARY FEDERAL AID HIGHWAY
CONSTRUCTED BY YEARS
1934-1980

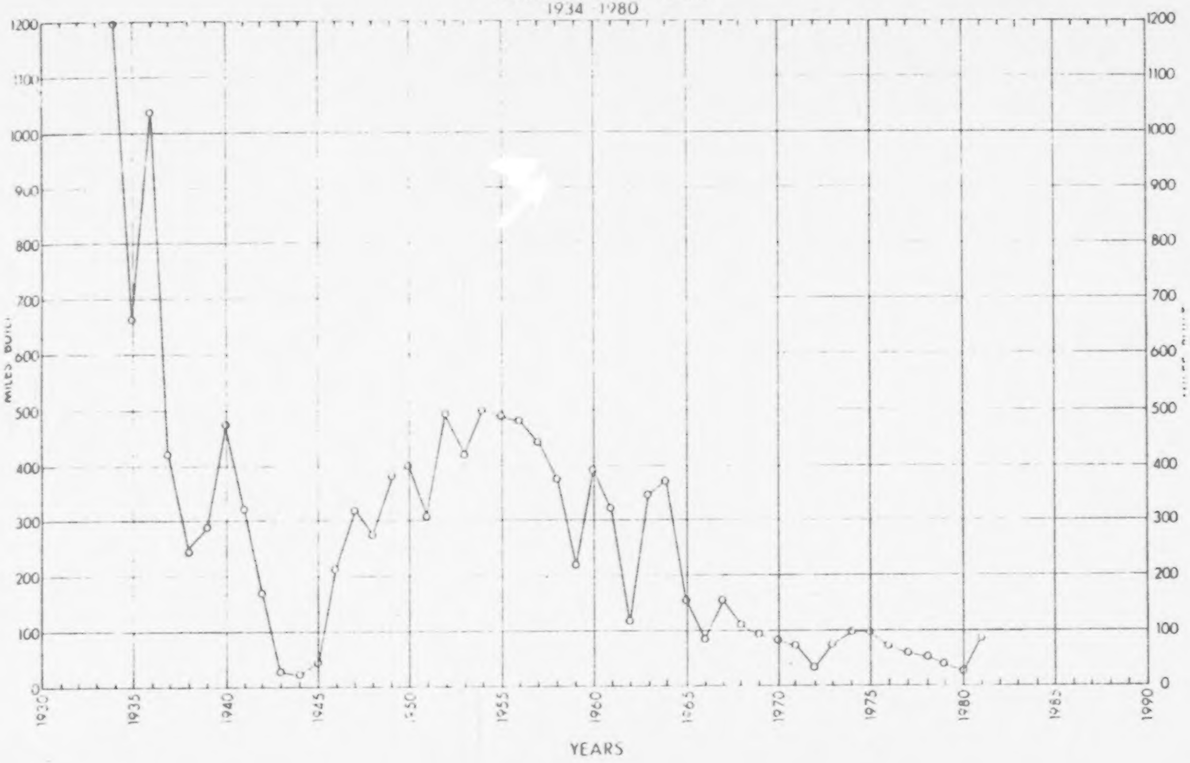

FIGURE 11

STATE OF NEW MEXICO
HIGHWAY DEPARTMENT

BRUCE KING
GOVERNOR

COMMISSION

Louis M. Whitlock
Chairman, Carlsbad

James W. Chaney
Vice-Chairman, Moriarty

Sosimo Padilla
Secretary, Albuquerque

Carlos Gallegos
Member, Las Vegas

Stephen T. "Bud" Richards
Member, Las Cruces

DEPARTMENT

Chief Highway Administrator
J.J. Hewett

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AN EQUAL OPPORTUNITY EMPLOYER

JUL

July 22, 1982

E - AASHTO

Mr. Francis B. Francois
Executive Director
American Association of State Highway
and Transportation Officials
444 North Capitol Street, NW, Suite 225
Washington, D.C. 20001

Dear Mr. Francois:

In response to that portion of your July 16, 1982 letter entitled "Possible Senate Hearings", we are forwarding herewith a summary (2 copies) of "New Mexico Highway Needs" which consists of various tables depicting needs of the State Highway System in New Mexico.

In response to that portion of your letter requesting copies of any recent highway cost allocation studies, this is to advise that New Mexico has not conducted such a study in recent years.

Sincerely,

Roy P Burns
acting
JOE HEWETT
Chief Highway Administrator

AWG:pt
Attachments

cc: Roy P. Burns

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
William C. Hennessy, Commissioner

1220 Washington Avenue, State Campus, Albany, New York 12232

AUG 03 1982

Francis B. Francois, Executive Director
American Association of State Highway
and Transportation Officials
444 N. Capitol Street, N.W., Suite 225
Washington, DC 20001

Dear Mr. Francois:

In response to your July 16, 1982 request, attached is a short statement of New York's highway needs. Our full highway needs are estimated at $25 to $30 billion. This amount includes the needs of both State and local government to fund improvements to all highways, roads and streets -- on and off the Federal-aid systems.

The attached statement was prepared specifically in response to your request. We do not have a current needs study report or cost allocation study which we can send.

We hope that this information will be useful in compiling a compelling argument for timely and adequate financing of a Federal-aid Highway program. We look forward to participating in the AASHTO panel which will present testimony on this subject to the Senate Committee.

Sincerely,

WCHennessy

W. C. HENNESSY
Commissioner

Attachment

NEW YORK'S HIGHWAY NEEDS

There are 109.4 thousand miles of public highways, roads and streets in New York with almost 17,400 bridges. Of that total 16.3 thousand miles of highway with 7,109 bridges which carry 60 percent of the traffic, are owned and operated by the State. The remainder of the system is owned and operated by the 1,609 counties, cities, towns and villages which comprise the State.

About 14,700 miles of State highways are included as portions of the various categories of Federal-aid highway systems along with 9,200 miles of major locally owned highways. About half of our bridges are located on Federal-aid highways.

	Federal-aid		Non-Federal-aid		Total	
	Highway (miles)	Bridges (number)	Highway (miles)	Bridges (number)	Highway (miles)	Bridges (number)
State	14,734	6,351	1,606	758	16,340	7,109
Local	9,163	2,430	83,903	7,787	93,066	10,217
Total	23,897	8,781	85,509	8,545	109,406	17,326

The investment in the construction and maintenance of the highway systems in New York by state and local governments is close to $2 billion annually. Despite this substantial investment, recent programs have not been adequate to maintain the integrity of the completed system and progress the additional capacity needed to sustain the industrial and commercial growth of the state. The overall condition of our existing highways and bridges declines each year and our capital construction program to provide needed new facilities on a timely basis is allowed to slip, due to an insufficient amount of funding.

While statistics are not available on the condition of local highways, about 13 percent of the surfaces and 21 percent of the bases of the state-owned system are rated as poor, requiring prompt remedial action beyond ordinary maintenance. It is estimated that $4.5 billion is needed to restore the state-owned highways to good condition. Additional billions will be required to restore the thousands of miles of local roads and streets which require capital improvements.

The condition of bridges in the state is even more critical than our highways. Over 42 percent of the major bridges on New York's Federal-aid system have been classified by FHWA as structurally deficient or functionally obsolete. Over 77 percent of the off-system bridges are so classified. Among state-owned structures, the number of structurally deficient bridges is increasing at an alarming rate, increasing by more than 500 bridges since 1977. Almost $7.0 billion is needed to correct our backlog of deficient bridges, without any consideration of the increasing number of bridges which become deficient each year.

To a great extent, the need for the construction of new highways in New York State has passed. However, there are several long-planned major projects which have been started and must be completed to realize the full benefits of the investment already made in these facilities. In addition, major reconstruction of highways throughout the state to provide the additional capacity needed to accommodate shifts in population and to encourage and sustain industrial and commercial expansion are needed.

Assuming the funds can be made available, the state has programmed an $800 million highway program for FFY 1983. This program will allow us to take care of only about 80 percent of the identified needs for the orderly reconstruction and rehabilitation of our existing facilities and the construction of long-planned new extensions and capacity improvements. To fully meet identified needs, at least another $200 million would be required next year.

The FHWA has estimated that New York will require an additional $2.0 billion to complete the Interstate System (including projects transferred to 4R status by redefinition). The latest Interstate 3R estimate identifies another $1.8 billion needed for Interstate resurfacing, restoration and rehabilitation--a total of $3.8 billion only for Interstate projects.

Bridge replacement and rehabilitation needs are estimated at $6.7 billion, while reconstruction and rehabilitation for state highways will require $4.5 billion. Added to this is $1.5 billion in programmed projects for highway expansion. A total of $12.7 billion will be required to satisfy our needs for rehabilitation of our existing facilities and to construct a long-planned modest program for expansion. An additional $8 to $10 billion will be needed to improve local roads and streets.

OHIO Department of
TRANSPORTATION

James A. Rhodes/Governor
David L. Weir/Director
25 South Front Street
P. O. Box 899
Columbus, Ohio 43216

August 2, 1982

Mr. Francis B. Francois
Executive Director
American Association of State
  Highway & Transportation Officials
444 N. Capitol Street, N.W.
Suite 225
Washington, D.C. 20001

Re: August 10 and 11 Senate Transportation Subcommittee Hearings

Dear Mr. Francois:

Your Bulletin #82-8 dated July 16, requested a short statement of the State's specific needs with respect to the major Federal-aid Highway Program for submission to the subject committee.

In our enclosed response we have limited our needs statement to the period beginning with Federal fiscal year 1983 and ending with Federal fiscal year 1986, the same periods covered by H.R. 6211 and S. 2574.

Very truly yours,

David L. Weir

David L. Weir, P.E.
Director

DLW:fm

Encl.

July 30, 1982

Ohio's Highway Needs
Fiscal '83 thru '86

The following is a short discussion of Ohio's Highway Needs through Federal fiscal year 1986 as they relate to obligation authority ceilings and ten of the major Federal-aid Highway Programs.

Ohio's highway preservation and construction program in the late 1970s and into 1981 suffered from increasingly inadequate State financial support. There had not been an increase in the State's motor fuel tax in twenty years. The situation became so severe that badly needed resurfacing had to be deferred, all new construction was halted, and by the end of fiscal 1980 lack of State matching funds had resulted in an unobligated balance of FHWA administered highway funds in excess of $300 million.

Then in 1981 the State enacted a new motor fuel tax aimed at restoring and maintaining Ohio's purchasing power at the 1975 level. The amount of the new tax reflects a two element formula; one element is the ratio of the current Federal maintenance construction cost index compared to that of 1975, and the other element compares Ohio motor fuel consumption of 1975 with that of today. Currently the added tax stands at 4.7 cents. There is a five cent ceiling.

With this significant increase in State highway revenue, the Ohio Department of Transportation (ODOT) has embarked on an expanded program of highway preservation and construction. However, it finds itself severely curtailed in this activity by the Federally imposed obligation authority limitations which prevents Ohio from recouping use of any significant part of the $300+ million of Federal apportionments that we were previously unable to match in a timely manner. Ohio's highway needs certainly include a change in Federal law that will permit states like Ohio, and particularly heavy donor states, to obligate all past Federal highway program apportionments.

Ohio's Interstate completion needs reflect the Federal limitations of the new Interstate definition of the Federal-aid Highway Act of 1981, and the 1978 Surface Transportation Act requirement that all remaining gaps be under contract by September 30, 1986. Given the above and considering a modest level of inflation, Ohio's Federal Interstate needs through fiscal year 1986 total approximately $600 million.

The Interstate Resurfacing (IR) program was expanded by the Federal-aid Highway Act of 1981 by the addition of the work no longer eligible under the Interstate completion program. In Ohio's case some $370 million (in 1979 dollars) was added to our IR funding needs. This added work continues to have the 1978 Act restriction requiring construction by the end of 1990. Ten percent of our Interstate Routes needs to be resurfaced each year if we are to maintain adequate pavement for the travelling public. For Ohio this means 130 miles at a cost in IR funds of $85 million per year. Therefore, our total IR needs through 1986 is $560 million.

Ohio has a Primary Program need that is well beyond the funding capability of the state and the Federal Government. Therefore in working with the legislature to obtain the motor fuel tax increase in 1981, we identified our highest priority new construction and major reconstruction projects and committed ODOT to pursue their implementation. The majority of the projects involve Federal Primary funds. Through 1986 approximately $310 million would be required to implement these selected projects. In our opinion we would have sufficient need and state matching to effectively utilize an additional $100 million of Primary funds should they become available.

Ohio's local governments suffered the same drop in highway program purchasing power in the late 70s and through 1981 as did the State and they share in the income from the added tax (25 percent). An increasing number are using their new state revenue in combination with Federal funds for 3R type activity. This plus the normal Secondary fund useage should result in a Secondary funding need through fiscal 1986 of approximately $70 million.

Currently planned Urban System projects will be able to utilize over $110 million of M funds in fiscal 1983 alone. With the increasing interest in 3R activity added to the normal Urban project load, we forecast a Urban System (M) fund need through fiscal 1986 of approximately $250 million.

There are over 28,200 bridges on Ohio's public roads and streets, and nearly 5,000 of these are currently substandard and in need of replacement or rehabilitation. If we assume a most optimistic average life span of 70 years, each year another 400 bridges will be added to the number requiring replacement or rehabilitation. Using the average cost to replace or repair presented in FHWA's March 1982 "Third Annual Report to Congress Highway Bridge Replacement and Rehabilitation Program" of $204,000, to not allow Ohio's number of deficient bridges to grow would cost $81.6 million per year (400 times $204,000). To eliminate the existing 5,000 deficient bridges would cost an additional $1,026 million. While we do not anticipate sufficient funding in the near future to accomplish all the above, we do anticipate a program that will need $250 million in Federal Bridge funds through fiscal 1986.

Interstate Transfer (IX) fund has developed into a severe funding problem in the Cleveland metropolitan area. Over the past three years the area has received allocations totaling only $27 million toward a total Federal commitment of $246 million. In 1982 Cleveland received nothing, even though firm documentation was provided that over $50 million of highway projects were ready to be let to contract. The Cleveland area is developing projects that will utilize the remaining balance of over $219 million by the end of 1986, thus meeting the Federal deadline. However, there is grave concern that Congress may not fulfill its part of the Transfer Agreement. There is a very real need for Congress to reaffirm its commitment to fund the IX Program and to distribute fairly the available funding.

The Appalachian Development Highway Program goal is to open up depressed areas to economic development. In Ohio that goal is being met in the areas where Appalachian Highways have been constructed. However we recognize that the Program cannot go on forever and are supportive of the National Governors Association and Appalachian Regional Commission's proposal to bring the program to a close at the end of this decade. Reflecting this proposal, Ohio's Federal APD fund needs through 1986 will total approximately $40 million. Over the past twelve months we have prefinanced Appalachian Development Highways projects totaling over $20 million in APD funds. The decision to go ahead with these projects reflects our full confidence in the Federal commitment to honor the transfer of these projects to regular financing in accordance with current Federal law and Regulation. We understand that suggestions have been made to not follow through on that conversion commitment. Such a decision would seriously impact not only the Appalachian Program but all other Federally assisted highway programs.

Among Ohio's special emphasis programs are Hazard Elimination (HES) and Railroad-Highway Crossing Protection (RRP-RRS). Our ongoing programs in these areas are dependent upon Federal assistance of at least $8 million per year for Hazard Elimination and another $8 million per year for Railroad Crossing Protection (RRP-RRS). The Crossing Protection Program has its own legislated state matching fund source totaling $1.2 million per year. These two programs have a total Federal fund need through fiscal 1986 of $64 million.

Ohio's needs through fiscal 1986 in 10 major Federal Program areas can be summarized as follows:

Interstate	$600M
Interstate 4R	560M
Primary	310M
Secondary	70M
Urban	250M
Bridge	250M
Interstate Transfer	219M
Appalachian Dev. Hwys.	40M
Hazard Elimination	32M
RR Crossing Protection	32M
Total - through 1986	$2,363M

VICTOR ATIYEH
GOVERNOR

Department of Transportation
HIGHWAY DIVISION
TRANSPORTATION BUILDING, SALEM, OREGON 97310

May 20, 1982

In Reply Refer to
File No.
PLA

The Western Association of State Highway and Transportation Officials (WASHTO) continues to have a strong interest in the subject of truck size and weight limits. For some time, WASHTO has been working in conjunction with the highway transport industry toward the establishment of uniform western regional truck size and weight standards. The WASHTO/HTI Joint Committee position was unanimously reaffirmed at a recent meeting of the chief administrative officers of WASHTO in Salt Lake City attended by 13 of the 15-member states (representatives from California and Hawaii were unable to attend).

WASHTO fully recognizes the benefits to be derived from increased national uniformity of truck sizes and weights. Nevertheless, we are opposed to certain provisions of the truck size and weight legislation (S. 1402 and H.R. 6211) now being considered by Congress. I have been asked to relay the position of the highway or transportation agencies of the western states for your consideration in developing our national legislation.

Our concern is based on the following points:

1. The amount of turning clearance required for a truck tractor/semitrailer combination increases substantially with slight increases in trailer length. For example, a 48-foot semitrailer requires five feet more clearance when going around a corner than does a 45-foot semitrailer. This additional required clearance would present serious problems at street intersections and interchange ramps. For this reason, WASHTO strongly recommends that the standard for semitrailers should be the 45-foot length supported by the western region representatives of the highway transportation industry. This recommendation is included in the attached resolution adopted by WASHTO a few years ago.

2. The legislation now being considered does not adequately address the effects which different vehicle configurations have on pavement deterioration. While a five-axle double-trailer combination does provide about 25 percent more cubic capacity than the conventional five-axle tractor/semitrailer combination, it also does significantly more pavement damage per ton or cubic foot of cargo hauled. Given the federal cost allocation study's finding that the larger combination trucks are underpaying relative to their cost responsibility, WASHTO does not believe that it is appropriate to explicitly encourage the use of vehicles which only add to the damage done to our highways without corresponding increases in road user fees.

   At the same time, WASHTO strongly supports a position where the states could allow more productive vehicle configurations. Since axle weight is the primary cause of road wear, laws and taxing schemes which promote lower axle weights, while permitting heavier gross weights, create a favorable situation for highway departments and industry alike. I am enclosing a chart which illustrates this point. The numbers in the final column, headed *18,000 Pound Axle Equivalent*, can be thought of as damage units. As can be observed, there are significant differences in the amount of road damage done by various vehicle configurations. We believe the states should be able to allow the operation of more productive truck combinations over portions of their road system.

3. In connection with the preceding point, WASHTO recommends that no changes in truck size and weight standards be made until such time as all interested parties have had an opportunity to review the findings and final recommendations of the Federal Cost Allocation Study. As the findings of this study can affect what the trucking industry is asked to pay, it underscores the importance of coordinating the study recommendations with any changes in truck size and weight standards. This item may be of less concern because I have been advised that members of the transportation subcommittees of both the House and Senate are aware of the major results of the federal study.

In summary, the three concerns I was asked to relate to you are:

(a) Standard semitrailer lengths should be limited to 45 feet.

(b) States should be able to work with the industry toward permitting in some locations the operation of more productive commercial vehicle combinations.

(c) Changes in truck size and weight should be reflective of the Federal Cost Allocation Study.

H S Coulter

H. S. Coulter, P.E.
State Highway Engineer

HSC:la

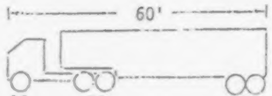
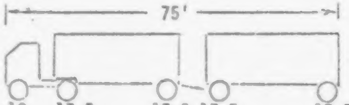
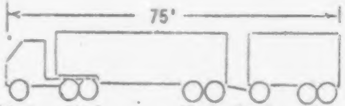
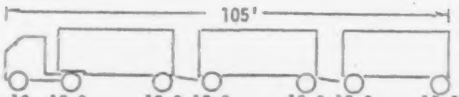
Att.

cc Francis B. Francois
Executive Director, AASHTO

Byron L. Geuy
Executive Director, WHI

WASHTO Chief Administrative Officers

COMPARISON OF PAYLOADS AND AXLE WEIGHT EQUIVALENTS

		Gross Weight	Gross Pay Load	Trips to Move 100,000 tons	18,000-pound axle Equivalent
					
weights 1000s	12 34 34				
000-pound equiv. . . .	0.36 1.45 1.45	80,000	44,000	4,545	14,816
					
	10 17.5 17.5 17.5 17.5				
	0.16 0.88 0.88 0.88 0.88	80,000	45,000	4,444	16,354
					
	11.6 29.6 31.4 13.8 19.1				
	0.30 0.80 1.03 0.32 0.24	105,500	65,650	3,046	8,194
					
	10 15.9 15.9 15.9 15.9 15.9 15.9				
	0.16 0.50 0.50 0.50 0.50 0.50 0.50	105,500	61,000	[illegible]	[illegible]

RESOLUTION

WHEREAS, the Joint WASHTO-HTI Committee has for some time been working toward identification of certain areas where greater uniformity may be realized with respect to vehicle size and weight standards required of the highway transport industry operations in the contiguous western states; and

WHEREAS, there appears to be agreement on some specific standards that would be beneficial to both the states and the highway transport industry if necessary changes are made in existing state and federal laws, rules, and regulations; and

WHEREAS, the specific standards for which there is substantial agreement for vehicles in regular operation on certain highways as designated by the individual states are as follows:

1. Width - No vehicle, including load and load-holding devices-but exclusive of tire bulge and approved safety devices, shall exceed a width of 102 inches.

2. Height - No vehicle, including load and load-holding devices, shall exceed a height of 13 feet-6 inches.

3. Lengths -

   A. No single truck or truck-tractor, including any load thereon and inclusive of any bumpers, shall exceed 40 feet.

   B. No single two-axle or three-axle bus, inclusive of any bumpers, shall exceed 40 feet.

   C. No single full trailer, including any load thereon and inclusive of any bumpers, shall exceed 40 feet.

   D. No single semitrailer, including any load thereon and inclusive of any bumpers, shall exceed 45 feet.

   E. No tractor semitrailer combination, inclusive of any bumpers, shall exceed 60 feet.

4. Axle Weights -

   A. The total gross weight imposed on the highway by the wheels of any one single axle shall not exceed 20,000 pounds.

B. The total gross weight imposed on the highway by the wheels of a tandem axle shall not exceed 34,000 pounds.

5. Gross Weight -

A. The total gross weight imposed on the highway by a vehicle or combination of vehicles shall not exceed 80,000 pounds.

WHEREAS, the specific standards for which there may be agreement for vehicles in regular operation on certain highways as designated by the individual states are as follows:

1. Axle Group Weights -

A. The total gross weight in pounds imposed on the highway by any group of two or more consecutive axles of a vehicle or combination of vehicles shall not exceed the values set forth in a table to be agreed upon by the various states. Said table shall be a modification of the Federal Table B to be developed following a technical review by appropriate representatives of the various states; and

WHEREAS, there is need for the WASHTO-HTI Joint Committee to continue efforts to obtain agreement on length and weight standards for other vehicle combinations; and

WHEREAS, these standards are proposed as minimum standards and the individual states at their discretion shall retain their rights to adopt or utilize vehicle size and weight standards exceeding these standards; and

WHEREAS, it appears appropriate that some states' statutes be changed or modified to reflect their Legislative Assembly's support of these minimum standards;

NOW, THEREFORE BE IT AND IT IS HEREBY RESOLVED, that WASHTO forward to the Western Conference, Council of State Governments the recommendation that they adopt a policy supporting those specific standards on which there is agreement and consider support of the other specific standards following documentation of future agreement. That said policy should be transmitted to the Legislative Assemblies of the WASHTO states and to the Congress of the United States urging the enactment of any necessary legislation to permit regular operation of vehicles having dimensions and weights conforming to these recommended minimum standards; and

BE IT FURTHER RESOLVED that those state agencies that can administratively take the necessary actions, increase or modify their existing standards to bring their state into agreement with these minimum size and weight standards; and

BE IT FURTHER RESOLVED that the WASHTO-HTI Joint Committee shall continue efforts to obtain agreement on those standards still to be resolved; and

BE IT FURTHER RESOLVED that the Congressional Delegations from the respective WASHTO states be furnished copies of this resolution as evidence of the ongoing efforts toward agreement concerning vehicle dimension and weight standards.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
HARRISBURG, PENNSYLVANIA 17120

OFFICE OF
SECRETARY OF TRANSPORTATION

July 30, 1982

Mr. Francis B. Francois, Executive Director
American Association of State Highway
and Transportation Officials
444 N. Capitol Street
N.W. Suite 225
Washington, D.C. 20001

Dear Mr. Francois:

This is in response to the request for information on our specific needs with respect to the Federal-aid Highway program as outlined on page 2 of your July 16, 1982 Bulletin #82-8.

I am enclosing two copies of the recently prepared brochure outlining our needs and areas of concern in surface transportation legislation. The information included in this brochure is consistent with the data furnished in my February 4, 1982 letter submitting the January 15, 1982 questionnaire from the Association.

Following is a composite of the categorical obligations I indicated Pennsylvania could undertake for Fiscal Years 1983 and 1984 if obligation ceilings were removed and apportionments were unlimited:

	FY 1983 ($ millions)	FY 1984 ($ millions)
Interstate	203	471
Interstate 4R	182	225
Interstate Discretionary	-0-	-0-
Primary	120	140
Urban	60	90
Secondary	24	28
Bridge Replacement	160	200
Bridge Discretionary	12.3	25.8
Safety	50	25
Other *	110	82
Total	$ 921.3	$ 1,286.8

*Includes Appalachian Development, Appalachian Access categories and Interstate Transfer projects.

I transmitted a summary of key highway legislative issues to you on June 22, 1982 in response to your June 10th letter as a review of Senate Bill 2574 and House Bill 6211, and I outline these comments as follows:

1) Apportionment Formulas: Several changes are being proposed for the apportionment formulas of key categorical programs.

   a) Interstate 4R - Consideration must be given to other factors in addition to Interstate lane miles and vehicle miles. H.R. 6211 makes an attempt to deal with this issue. The inclusion of fuel consumption, both diesel and gasoline offers a surrogate for more appropriate factors such as truck traffic; and in addition, provides a basis for measuring the impact of terrain and weather on the System -- more fuel is consumed in rugged terrain and under severe weather conditions.

   b) Interstate Transfer - The apportionment formula proposed in H.R. 6211 would distribute 75 percent of the funding based on the cost to complete highway substitute projects. The approach would help to target scarce resources to the areas of greatest need.

   c) Consolidated Primary - The existing formula needs a thorough review -- it includes irrelevant factors such as land area.

   d) Obligation Ceilings - In the distribution of obligation authority by state, consideration needs to be given to those states with large unobligated balances.

2) Transferability Between Programs: Scarce resources dictate that existing transferability provisions be increased. Both H.R. 6211 and S. 2574 offer relief. S. 2574 would permit 100 percent transferability between Primary, Urban and Rural (Secondary) categories. H.R. 6211 would permit 50 percent transferability from Interstate completion to 4R.

3) Funding Authorizations: Highway and Bridge needs nationally have been well documented. H.R. 6211 would provide a more responsible funding level given identified requirements.

The above information is a condensed summary of the information included in the enclosures, and I trust it will be satisfactory. I realize the brochure is more than the one or two page statement you suggest; however, feel free to use only those pages which you consider pertinent if this would be more satisfactory.

Sincerely,

Thomas D. Larson, P.E.
Secretary of Transportation

Enclosures

SOUTH Dakota
Department of Transportation
Office of the Secretary
Pierre, South Dakota 57501

July 23, 1982

Mr. Francis B. Francois
Executive Director, AASHTO
444 North Capitol Street, N. W.
Suite 225
Washington, D. C. 20001

Dear Mr. Francois:

This letter is in response to AASHTO's Legislative Bulletin #82-8 dated July 16, 1982, in which you requested that each state submit a statement of their specific Federal-Aid Highway Program Needs, broken down by major categories.

Enclosed, as requested, is a summary of South Dakota's current highway needs with supporting data from our computerized needs study.

Sincerely,

Eugene L. Rowen
Secretary of Transportation

ELR:pjs

Enclosures

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

CURRENT STATEWIDE BACKLOG NEEDS

To determine highway needs, the South Dakota Department of Transportation has a computerized highway needs analysis and project analysis process which has been operational for several years. This process utilizes the Present Serviceability Rating (PSR) approach for determining the surface condition. By this method, backlog needs and accruing needs are easily determined. Needs are considered as backlog when the surface condition becomes intolerable.

As shown on the attached summaries from our most recent statewide federal-aid primary and federal-aid needs reports, the backlog needs are as follows:

FUNCTIONAL CLASS	RESURFACING		GRADING & SURFACING		STRUCTURE NEEDS	TOTAL
	MILES	DOLLARS	MILES	DOLLARS		
Principal & Minor Arterials	883.0	57,700,000	513.0	283,800,000	67,000,000	408,500,000
Major Collectors (On State System)	416.0	29,700,000	326.0	95,800,000	14,500,000	140,000,000
SUBTOTAL	1299.0	87,400,000	839.0	379,600,000	81,500,000	548,500,000
Interstate System						
			Interstate 4-R Roadway Needs			15,122,000
			Interstate 4-R Structure Needs			16,077,000
			SUBTOTAL			31,199,000
TOTAL						579,699,000

The last Interstate surfacing project, which will complete the initial construction of the Interstate in South Dakota, was let to contract July, 1982. It has taken nearly 30 years to accomplish this goal. Now that it is completed, we find a sizeable backlog of 4-R type needs have accrued and, as the network becomes older, additional Interstate 4-R needs will accrue at an accelerated rate.

Attached are two documents which show the backlog 4-R roadway needs and the backlog 4-R structure needs. These backlog needs were compiled by departmental personnel who utilized the last 3-R study and inspected the projects in the field. All projects are current backlog needs and are programmed for improvement.

COMMISSION
ROBERT H. DEDMAN, CHAIRMAN
A. SAM WALDROP
JOHN R. BUTLER, JR.

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
DEWITT C. GREER STATE HIGHWAY BLDG.
AUSTIN, TEXAS 78701

ENGINEER-DIRECTOR
MARK G. GOODE

July 28, 1982

IN REPLY REFER TO
FILE NO.

Mr. Francis B. Francois
Executive Director
American Association of State Highway
and Transportation Officials
444 N. Capitol Street, N.W., Suite 225
Washington, D. C. 20001

Dear Mr. Francois:

We are pleased to furnish you two copies of our "Statement of Specific Needs" for funding proposed highway improvement projects/programs as requested in your letter of July 16, 1982. We have addressed both the immediate need to fund Federal-aid projects for the next fiscal year as well as long-range funding needs as identified by our recently completed Operational Planning Study. Because of the voluminous data involved in developing and documenting this study, we are only sending a capsulated summary of the results.

If additional information is needed, please advise.

Sincerely yours,

Mark Goode
M. G. Goode
Engineer-Director

Attachments

HAROLD C. KING, COMMISSIONER
EUGENE M. BANE, GRUNDY, *BRISTOL DISTRICT*
T. GEORGE VAUGHAN, JR., GALAX, *SALEM DISTRICT*
WILLIAM R. WATKINS, SOUTH BOSTON, *LYNCHBURG DISTRICT*
WILLIAM F. MOHR, RICHMOND, *RICHMOND DISTRICT*
RICHARD S. BRYDGES, VIRGINIA BEACH, *SUFFOLK DISTRICT*
N. P. HUMPHREYS, JR., WEEMS, *FREDERICKSBURG DISTRICT*
JOSEPH M. GUIFFRE, ALEXANDRIA, *CULPEPER DISTRICT*
ROBERT W. SMALLEY, BERRYVILLE, *STAUNTON DISTRICT*
T. EUGENE SMITH, MCLEAN, *AT LARGE-URBAN*
ROBERT A. QUICKE, BLACKSTONE, *AT LARGE-RURAL*

COMMONWEALTH *of* VIRGINIA
DEPARTMENT OF HIGHWAYS & TRANSPORTATION
1221 EAST BROAD STREET
RICHMOND, 23219

LEO E. BUSSER, III
DEPUTY COMMISSIONER
J. M. WRAY, JR.
CHIEF ENGINEER
J. T. WARREN
DIRECTOR OF ADMINISTRATION
OSCAR K. MABRY
DIRECTOR OF PLANNING
H. W. WORRALL
DIRECTOR OF FINANCE
JACK HODGE
ASSISTANT CHIEF ENGINEER

IN REPLY PLEASE REFER TO

August 4, 1982

State Highway Program

Mr. Francis B. Francois
Executive Director
American Association of State Highway
and Transportation Officials
444 North Capitol Street, N.W., Suite 225
Washington, D. C. 20001

Dear Mr. Francois:

In reference to your request of July 16, 1982, I have attached a copy of our Critical Improvement Program which was the basis for our request for additional highway revenue in the 1982 Session of our General Assembly. While our needs exceed those identified in the Critical Improvement Program, we believe it represents the minimum investment for completion of the Interstate System and those critical improvements on our Primary, Urban, and Secondary Systems.

Should you need additional information, please advise.

Sincerely,

Harold C. King

Harold C. King, Commissioner

Attachment

CRITICAL IMPROVEMENT PROGRAM COMPARED TO PROGRAM POSSIBLE WITH CURRENT REVENUES
(Thousands of Dollars)

P & S
11/23/81

	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	TOTAL
CRITICAL IMPROVEMENT PROGRAM:							
Construction:							
Interstate	211,665	231,154	234,042	242,279	212,484	212,484	1,344,108
Primary	119,039	120,498	122,883	125,139	129,984	133,215	750,758
Urban	76,010	77,619	78,985	80,606	81,242	82,856	477,318
Secondary	83,810	85,670	87,249	89,123	89,858	91,723	527,433
Subtotal	490,524	514,941	523,159	537,147	513,568	520,278	3,099,617
Maintenance	323,300	356,900	401,426	443,900	491,700	546,500	2,563,726
Public Transit	19,896	22,179	19,694	28,328	20,245	22,208	132,550
Total	833,720	894,020	944,279	1,009,375	1,025,513	1,088,986	5,795,893
PROGRAM POSSIBLE WITH CURRENT REVENUES:							
Construction:							
Interstate	211,665	231,154	--	--	--	--	442,819
Primary	39,622	3,483	--	--	--	--	43,105
Urban	36,300	19,111	--	--	--	--	55,411
Secondary	37,912	18,044	--	--	--	--	55,956
Subtotal	325,499	271,792	--	--	--	--	597,291
Maintenance	323,300	356,900	401,426	406,836	411,698	416,443	2,316,603
Public Transit	12,300	12,300	12,300	12,300	12,300	12,300	73,800
Total	661,099	640,992	413,726	419,136	423,998	428,743	2,987,694
TOTAL SHORTFALL	172,621	253,028	530,553	590,239	601,515	660,243	2,808,199
Offset by Federal-aid	0	36,050	275,974	282,514	260,294	260,294	1,115,126
State Fund Shortfall	172,621	216,978	254,579	307,725	341,221	399,949	1,693,073
STATE FUND PROGRAM SHORTFALL:							
Construction	165,025	207,099	247,185	254,633	253,274	259,984	1,387,200
Maintenance	0	0	0	37,064	80,002	130,057	247,123
Public Transit	7,596	9,879	7,394	16,028	7,945	9,908	58,750
STATE FUND SHORTFALL:	172,621	216,978	254,579	307,725	341,221	399,949	1,693,073

CRITICAL IMPROVEMENT PROGRAM AS COMPARED TO PROGRAM POSSIBLE WITH CURRENT REVENUES
1982-83 THRU 1987-88
(In Thousands)

INTERSTATE SYSTEM

DISTRICT	CRITICAL IMPROVEMENT PROGRAM	CURRENT REVENUI
BRISTOL	$ 34,396	$ 19,041
SALEM	25,081	8,736
LYNCHBURG	--	--
RICHMOND	234,393	77,188
SUFFOLK	556,557	163,279
FREDERICKSBURG	92,435	30,439
CULPEPER	346,686	123,864
STAUNTON	6,878	4,378
TOTAL	$1,296,426	$426,925

CRITICAL IMPROVEMENT PROGRAM AS COMPARED TO PROGRAM POSSIBLE WITH CURRENT REVENUES
1982-83 THRU 1987-88
(In Thousands)

PRIMARY SYSTEM

DISTRICT	CRITICAL IMPROVEMENT PROGRAM	CURRENT REVENUE
BRISTOL	$ 90,275	$ 5,022
SALEM	105,505	6,180
LYNCHBURG	93,619	5,375
RICHMOND	92,567	5,314
SUFFOLK	103,381	7,136
FREDERICKSBURG	58,333	3,349
CULPEPER	127,994	5,353
STAUNTON	79,084	5,376
TOTAL	$750,758	$43,105

CRITICAL IMPROVEMENT PROGRAM AS COMPARED TO PROGRAM POSSIBLE WITH CURRENT REVENUES
1982-83 THRU 1987-88
(In Thousands)

URBAN SYSTEM

DISTRICT	CRITICAL IMPROVEMENT PROGRAM	CURRENT REVENUE
BRISTOL	$ 15,000	$ 1,700
SALEM	50,900	5,900
LYNCHBURG	28,900	3,400
RICHMOND	68,900	8,100
SUFFOLK	225,318	25,711
FREDERICKSBURG	9,300	1,500
CULPEPER	53,100	6,100
STAUNTON	25,900	3,000
TOTAL	$477,318	$55,411

JOHN SPELLMAN
Governor

DUANE BERENTSON
Secretary

STATE OF WASHINGTON
DEPARTMENT OF TRANSPORTATION
Highway Administration Building • Olympia, Washington 98504 • (206) 753-6005

August 4, 1982

Mr. Francis B. Francois, Executive Director
American Association of State Highway and
Transportation Officials
444 N. Capitol Street, N. W.
Suite 225
Washington, D. C. 20001

Dear Frank:

This letter is to confirm the information that we reported to your office by telephone on August 3, 1982, concerning Federal-Aid Highway program needs. Per your request in Bulletin #82-8, our Department's needs are presented by major Federal-Aid Highway program categories. I would like to emphasize that the following figures represent our highway needs, and not necessarily our program plans.

FEDERAL-AID HIGHWAY FUNDING NEEDS
FEDERAL AND STATE SHARES COMBINED

Interstate Completion - $2,180,504,000 (From 1981 ICE)
Interstate 4R - Data Under Development

(Constant 1983 Dollars in Millions)

	1983-85	1985-89	1989-95
Primary	305	568	1,386
Secondary	31	58	142
Urban	232	605	
Bridge-State	44	88	132
-City and County	42.7	85.4	128.1

Discretionary Bridge--------------------237--------------------

Sincerely,

JAMES L. CLEMEN
Assistant Secretary for
Management Services

JLC:sjy

WEST VIRGINIA DEPARTMENT OF HIGHWAYS
1900 Washington Street, East
Charleston, West Virginia
25305

JOHN D. ROCKEFELLER IV
GOVERNOR

CHARLES L. MILLER
COMMISSIONER

July 30, 1982

Mr. Francis B. Francois
Executive Director
American Association of State Highway
and Transportation Officials
444 N. Capitol Street, N. W.
Suite 225
Washington, DC 20001

Dear Mr. Francois:

In the American Association of State Highway and Transportation Officials' Bulletin #82-8, dated July 16, 1982, there was a request for a statement of West Virginia's specific needs with respect to the Federal-aid Highway Program, broken down by major categories. We are pleased to furnish two (2) copies of West Virginia's needs statement, one for the Senate Transportation Subcommittee and one for your files.

If we may be of any further assistance, please do not hesitate to contact us.

Sincerely yours,

Charles L. Miller
Commissioner

CLM:Tg

Attachments

SUMMARY OF WEST VIRGINIA DEPARTMENT OF HIGHWAYS' FEDERAL-AID HIGHWAY PROGRAM NEEDS

I. INTERSTATE COMPLETION NEEDS

The most current estimate of the cost to complete the Interstate system in West Virginia is approximately $161 million annually.

II. INTERSTATE "4R" NEEDS

The recently submitted 1983 Interstate Cost Estimate of Interstate "4-R" needs totals about $84 million annually, excluding pavement overlays.

III. FEDERAL-AID PRIMARY AND FEDERAL-AID SECONDARY NEEDS

A. Renovation

The resurfacing of paved roads and the restabilizing of gravel roads on a 15-year cycle would require an annual expenditure of some $81 million (FAP/FAS/FAU).

B. Improvement

Conservative estimates put these needs at as much as $234 million annually.

C. Expansion Needs

It is currently estimated that West Virginia will expend some $5 million annually for "access roads" alone.

IV. FEDERAL-AID URBAN NEEDS

An estimate of these needs was obtained from the Department's Urban Transportation Studies, with resulting needs approximating $49 million annually.

V. BRIDGE NEEDS

At present, it is conservatively estimated that an annual expenditure of some $62 million would be necessary to eliminate the present backlog of deficient bridges in twenty years. This figure does not take into consideration those bridges that, while not currently considered deficient, would become deficient within the next twenty years.

VI. "OTHER" NEEDS

To eliminate the 365 worst slides (of the 1,142 identified in 1980) within ten years, approximately $8 million annually would be needed. Additionally, renovation of signs, signals, guardrails, markers and lighting would require $3 million annually.

VII. TOTAL NEEDS

The above needs total $687 million annually.

State of Wisconsin \ DEPARTMENT OF TRANSPORTATION

OFFICE OF THE SECRETARY
Room 120B Hill Farms State Office Bldg.
4802 Sheboygan Avenue
P. O. Box 7910
Madison, WI 53707
Telephone 266-1113

July 29, 1982

Mr. Francis B. Francois, Executive Director
American Association of State Highway and
Transportation Officials
Suite 225
444 North Capitol Street, N.W.
Washington, D.C. 20001

Dear Frank:

Per your request of July 16, enclosed is a brief compilation of this Department's best estimate of reasonable annual needs with respect to the Federal-Aid Highway program.

We have included only those major categories which appear to be the focus of continuing interest in Congress. The needs estimates are larger than the resources available to meet them at all levels. However, these are moderate-level need estimates, not a listing of every potential improvement which has been suggested.

Of extreme importance is the fact that significant state and local tax increases will be necessary immediately just for the state and localities to maintain their current levels of effort, and this current effort is far below what is needed

I hope this information serves your needs. If additional information or clarification is needed, don't hesitate to call me.

Sincerely,

Marv Schaeffer

Marvin J. Schaeffer
Deputy Secretary

MJS:cln
Enclosure

Prepared by Wisconsin
Department of Transportation

PROJECTED ANNUAL NEEDS ON FEDERAL-AID HIGHWAY SYSTEMS IN WISCONSIN, BY FEDERAL AID CATEGORY

Introduction

The following estimates of need on Federal-aid highway systems in Wisconsin are drawn from various parts of Wisconsin's highway planning and programming process. Because these are the same needs estimates used in developing the state highway budget, these need estimates are already significantly constrained by the limited availability of funds at the state and local level, as well as the federal level. These estimates of needs reflect the realities of the 1980's, not the "wish lists" of the 1960's and early 1970's.

Interstate Completion

Wisconsin has recently completed updating its cost estimate for remaining work to complete the Interstate system. This cost estimate does reflect changes resulting from the redefinition of Interstate completion costs passed by Congress in 1981. Some earlier elements have been deleted and others, which remain a priority, have been shifted to the I4R category. Any amount which may subsequently be deleted from this cost estimate as the result of FHWA review should be considered an addition to I4R need, since all remaining work is essential. By 1986 or before, Wisconsin's completion cost estimate will be at zero.

	($000,000) Annual Need Through 1986
Interstate Completion	17.740

Interstate 4R

This annualized Interstate 4R needs estimate reflects the addition of some elements previously listed under completion and assumes that about 402 miles of Wisconsin's 578-mile Interstate system will require some degree of rehabilitation between now and 1990. The type of work envisioned here should ensure that rehabilitation or resurfacing should not be required again on these segments in the near future.

	($000,000) Annual Needs Through 1990
Interstate Rehabilitation	33.677
Interstate Bridges	7.700
Prior Completion Elements	3.268
I4R Total	44.645

Primary

On the primary system, needs have been estimated based upon a reasonable program of system preservation and rehabilitation. Only selected and vital projects involving capacity expansion are included.

	($000,000) Annual Needs Through 2000
3R Needs	107.96
Minimum Capacity Increases	51.46
Primary Total	159.42

Secondary

Estimates of needs on the secondary system are entirely based on projects related to system preservation and rehabilitation. No expansion is envisioned.

	($000,000) Annual Needs Through 2000
State System	33.17
Local Systems	37.82
Secondary Total	70.99

Urban

For local systems, these estimates reflect only preservation and rehabilitation efforts. The state needs reflect only urgent urban capacity increase needs.

	($000,000) Annual Needs Through 2000
State	5.53
Local	37.75
Urban Total	43.28

Bridges

The level of effort outlined in the needs estimate for bridges would deal only with critical needs to maintain service levels near current levels. It would not, for example, address all structures that are deficient by federal standards.

	($000,000) Annual Needs Through 1988
State	
Replacement (25)	14.127
Repair (24)	8.600
High Cost Replacement (1)	7.843
Local	
Replacement (171)	37.323
Repair (46)	6.299
Bridges Total	74.191

Safety

	($000,000) Annual Needs Through 1988
Hazard Elimination	5.0
Rail/Highway Crossings	4.0
Safety Total	9.0

Total Annual Needs - Federal Aid Highway Program	$419.266
1982 Federal Apportionments to Wisconsin	$118.347

These estimates reflect the annual cost of providing a reasonable level of service on each of the federal aid systems. It does not reflect any particular funding sources (local, state, federal). Where federal funds are inadequate to meet identified needs, state and local decisions will be required regarding which projects will be financed on a state or local funding basis.

These estimates are for the federal aid systems only, and do not reflect approximately $200 million in annual needs which exist on non-federal aid roads and must be financed entirely with state or local funds. The additional annual costs of state and local road maintenance are also not reflected here. It should be noted that a state gas tax increase of between 2¢ to 3¢ per gallon will be required next year merely to permit WisDOT to hold constant its contribution to maintenance and construction. Similar local revenue increases will be required for local governments to accomplish the same maintenance and improvement work they have undertaken in the past.

Prepared by Wisconsin
Department of Transportation

PROJECTED ANNUAL NEEDS ON FEDERAL-AID HIGHWAY SYSTEMS IN WISCONSIN, BY FEDERAL AID CATEGORY

Introduction

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A REVIEW OF
"EFFECTS OF TRUCK WEIGHTS ON PAVEMENT DETERIORATION (TEXAS TRANSPORTATION INSTITUTE)"
AND
"CAUSES OF PAVEMENT DAMAGE ON INTERSTATE HIGHWAYS (COUNSELTRANS)"

by

AMERICAN ASSOCIATION OF STATE HWY. & TRANSPORTATION OFFICIALS

February 1982

A REVIEW OF

"Effects of Truck Weights on Pavement Deterioration (TTI)"
"Causes of Pavement Damage on Interstate Highways (CounselTrans)"

The American Association of State Highway and Transportation Officials is vitally interested in the performance of pavements. Factors affecting pavement performance such as magnitude and frequency of axle loads and environmental conditions are of prime concern. Due to this concern thoroughly documented research was conducted "to establish relationships showing how performance of pavements is influenced by structural design, represented by component thicknesses of the pavement structure, and loading." This research was conducted in the AASHO Road Test in Ottawa, Illinois, completed in 1962. Approximately 27 million dollars was spent in this effort. Subsequent research and satellite studies have substantiated and reconfirmed the basic findings of the AASHO Road Test.

Two recent reports have attempted to determine causes of pavement damage and deterioration. Both reports were written for the American Trucking Association and the Motor Vehicle Manufacturers Association as a result of the federally mandated Cost Allocation and the Truck Size and Weight Studies. The reports are "Effects of Truck Weights on Pavement Deterioration" by the Texas Transportation Institute (TTI) and "Causes of Pavement Damage on Interstate Highways" by CounselTrans (CTI). TTI attempted to classify pavement distress into the categories of traffic loads, climate, and a combination of the two. CTI used the categories of load-caused distresses and non-load caused or environmental distresses.

It has been determined that both reports failed to point out that loads and environmental factors interact, one reinforcing the other, to cause pavement distress. This has long been recognized by highway engineers. Both reports attempted to isolate pavement distress mechanisms attributable to environmental factors from pavement distress resulting from loads. Neither TTI or CounselTrans fully addressed the fact that many non-load types of distress are aggravated or intensified by loads, so that significant portions should be attributed to load related causes after the inception. TTI best summarizes the problem by stating, "it is impossible to state in general how much damage is done by load, climate, and combined influences."

Many non-load associated distress types become important only when made worse by loading. Examples of this include surface deterioration, popouts, corner spalling and ravelling. However, in the analysis by CTI popouts and ravelling are given the same weight as faulting and alligator cracking in rutted wheelpaths.

CounselTrans put distress types in a load or non-load category for analysis at all pavement ages. Non-load distresses such as joint spalling will indeed occur regardless of traffic loading. But once stress is relieved by cracking, the distress will stabilize unless acted on by traffic. Thus, while the initial stages can be classified as non-load, increases in severity most often are associated with loads.

To illustrate the complexity of the problem, TTI and CounselTrans differed on the causes of numerous types of distress. Attached are tables comparing the two studies with the "Highway Pavement Distress Identification Manual," Report No. FHWA-RD-79-66, 1979. It is readily apparent that the two studies don't agree with the FHWA report nor with each other. Even though it is important to determine the assignment of cause of distress, the two research efforts couldn't reconcile what the assignment should be. Another illustration is that TTI and CounselTrans differed on the cause of distress in joint deteioration. TTI concluded that load is a major contributing factor to joint deterioration. However, CTI concluded that joint deterioration is due to factors other than loading. Such differences raise questions regarding conclusions of either report relating to distress causative factors.

The CounselTrans report appears written to support a predetermined conclusion that environment causes the majority of deterioration. An example of this is a statement in the opening part of the report. They refer to a publication by the General Accounting Office which centered on problems of commercial vehicle overloading by saying "the problem with these allegations and inferences is that they have been based entirely on opinion and conjecture."

The two studies contain weaknesses in their approach to the problem as well as in the data bases and predictive models developed. The study findings are subject to a variety of assumptions that have yet to be proven. The distress types are put in a load or non-load category and remain there for analysis at all pavement ages. This does not represent reality because many non-load types of distress are aggravated or intensified by loads so that significant portions should be attributed to load-related causes after the inception.

While it appears that both research agencies considered they were dealing with a complex topic, CounselTrans indicates it has developed trends "soundly supportable from a statistical and mathematical standpoint." TTI researchers on the other hand looked to actual field performance evaluation schemes and studies to supplement their analysis. This difference in scope probably gives rise to the widely different load-damage ratios ultimately presented by each research agency.

For rigid pavements, TTI used a one point predictive model that is of questionable validity. It was based on one state and predominantly one design, a ten inch jointed reinforced concrete pavement on granular subbase with no variables in percent of reinforcement or joint design. Yet this model is applied to states having different climates and different rating systems.

The data gathered by CTI was collected by windshield survey at normal operating speed. Questionable is the hasty time frame (one and a half months for each of the two study phases) and the use of "innovative techniques" to reach "definitive findings." The effort and control of this study can in no way compare to the effort and control that went into the AASHO Study referred to in the introduction.

The Counsel Trans report mistakenly concludes there is no measurable effect of different maximum axle loads on pavement deterioration. What was actually compared was the number of equivalent axle loads and the amount of pavement distress on different roads, not the direct relationship between axle weight and pavement distress.

TTI brings out that the AASHO road test equations do not fit well at low serviceability index values. This information isn't relevant since the curves fit reasonably well down to a present serviceability index of 2.5 or 3.0, a level at which most major highways are rehabilitated.

Some excellent case studies on the subject exist which are thoroughly documented by various states. Examples which could have been used by the research agencies are as follows:

Caltrans compared two freeways during a 35 year time span, both freeways having similar pavement thicknesses. One had basic travel only and the other carried mixed traffic consisting of many heavy vehicles. Numerous repairs were required for the mixed traffic freeway. The other freeway required little or no maintenance.

Oregon has a section of jointed concrete pavement that was inventoried for cracking after serving mostly light local traffic for approximately 15 years. The section was then used to carry normal interstate traffic during completion of a freeway project. Cracking from the first 15 years was minor in comparison to the cracking experienced when the section carried heavier traffic for a two year period.

The CTI report stated "even the incidence and magnitude of overloads, which have occurred, proportionately as a result of illegal operations, are not really pertinent." A 1975 study by Pennsylvania refutes this claim. A bridge on Interstate 80, their heaviest truck route, was instrumented to test the feasibility of using a bridge superstructure to determine axle and gross weights. The study determined that during an 86 hour continuous sampling period, 33% of the axles on 5 axle trucks exceeded legal loads. A 33% overload occurrence is certainly significant.

More documented case studies from states could be given to illustrate the damage of heavy loads. Case studies conducted in a sound scientific manner are much more believable than "innovative techniques" used to reach "definitive findings."

Due to the reasons summarized here, it is the opinion of the American Association of State Highway and Transportation Officials that the conclusions of the two consulting reports are not valid.

FLEXIBLE PAVEMENTS DISTRESS CLASSIFICATION

Distress No.	Distress	Causes of Distress (FHWA Project)	TTI	CounselTrans
1	Alligator Cracking	L, EP, EA, AA	Load*	Load
2	Bleeding	L, EP, E	Combined	——
3	Block Cracking	EP, E, AA	Climatic	Nonload
4	Corrugation	L, EP	Load	Nonload
5	Contraction/ Shrinkage Fracture	E, AA	Climatic	——
6	Depression	L, EP	Load	Nonload
7	Joint Reflection Cracking	L, E	Combined	Nonload
8	Lane/Shoulder Drop-off	L, EA, E	Combined	Nonload
9	Lane/Shoulder Separation	L, E	Combined	Nonload
10	Meandering Cracks	E	Climatic	——
11	Non-reflective Transverse and Longitudinal Cracking	L, EP, E, AA	Climatic*	Nonload
12	Pavement Edge Cracking	L, EP, EA	Load	——
13	Potholes	L, E	Combined	Load
14	Raveling and Weathering	EP, EA, E, AA	Climatic*	Nonload
15	Rutting	L, EP	Load	Load
16	Shoving	L, EP	Load	——
17	Swelling and Bumps	E	Climatic	Nonload
18	Longitudinal Cracking in Wheelpaths		——	Load
19	Patching in Wheelpaths		——	Load
20	Pumping/Water Bleeding		——	Load
21	Slippage Cracking		——	Nonload
22	Longitudinal Cracking not in Wheelpaths		——	Nonload
23	Patching not in Wheelpaths		——	Nonload

* In these cases, the predominant cause was used to classify the distress.

L - Load related distress
EP - Combined distress with environmental passive
EA - Combined distress with environmental active
AA - Combined distress with aging active
E - Environmental distress

JOINTED CONCRETE PAVEMENT DISTRESS CLASSIFICATION

Distress No.	Distress	Causes of Distress (FHWA Project)	TTI	CounselTrans
1	Blow up	E	Climatic	Nonload
2	Corner cracking	L, EP, EA	Combined	Load
3	Corner spalling	L, E	Combined	Nonload
4	Depression	L, E	Combined	Nonload
5	Durability Cracking	E	Climatic	Nonload
6	Faulting	L, EA, E	Combined	Load
7	Joint Failure	EP, EA, E	Combined	Nonload
8	Lane/Shoulder Dropoff	L, E	Combined	Nonload
9	Potholes	L, E	Combined	-----
10	Longitudinal Cracking	L, EP, EA, E	Combined	Nonload
11	Joint/Crack Spalling	L, E	Combined	Nonload
12	Popouts	L, EA	Combined	Nonload
13	Random Cracking	L, E	Combined	Load
14	Scaling and Crazing	L, E	Combined	Nonload
15	Second Stage Cracking	L, EP, EA, E	Combined	Load
16	Swell	E	Climatic	Nonload
17	Transverse and Diagonal Cracking	EP, EA, E	Combined	Load & Nonload
18	Shattered Slab	L, EP, EA	Combined	-----
19	Pumping/Water Bleeding		-----	Load
20	Third Stage Cracking		-----	Load
21	Patching		-----	Nonload
22	Patch Deterioration		-----	Nonload

L - Load related distress
EP - Combined distress with environmental passive
EA - Combined distress with environmental active
AA - Combined distress with aging active
E - Environmental distress

AMERICAN ASSOCIATION OF STATE HIGHWAY
AND TRANSPORTATION OFFICIALS

JOHN A. CLEMENTS, President
Commissioner
New Hampshire Department of Public Works
and Highways

FRANCIS B. FRANCOIS
Executive Director

October 20, 1982

Mr. Steve D. Symms
Chairman, Subcommittee on Transportation
Senate Committee on Environment and Public Works
4204 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Senator Symms:

This is in response to your letter of September 16th in which you enclosed questions pertaining to your Subcommittee's hearings on highway program needs, revenues, and cost allocation issues.

Your final question (No. 27) asked whether AASHTO had completed its initial review of the final report of the U.S. DOT Cost Allocation Study. This review has been undertaken as a special project by AASHTO's Highway Subcommittee on Highway Transport. The review is in progress at this time. The Subcommittee is meeting in Dallas this week and intends to complete its initial review at that time. Our schedule provides for the Subcommittee and the full AASHTO Highway Committee to complete its review in time for Policy Committee consideration during our Annual Meeting on November 21.

As this review has not been completed it was impossible to respond to your other questions from an overall AASHTO viewpoint. Therefore, responses are being furnished by the four primary witnesses at your hearings, i.e., Harold C. King, Commissioner, Virginia Department of Highways and Transportation; Robert N. Hunter, Chief Engineer, Missouri Highway and Transportation Commission; John B. Kemp, Secretary, Kansas Department of Transportation; and myself as Commissioner, New Hampshire Department of Public Works and Highways. Understandably, the enclosed responses represent the views of the respective states of the respondents.

AASHTO appreciates very much the opportunity to provide responses to these questions on this very important matter. If you need any further information, please do not hesitate to contact me.

Sincerely,

John A. Clements
President

JAC:WTD:cam
enclosure

EXECUTIVE OFFICE: 444 N. Capitol Street, N.W., Suite 225 Washington D.C. 20001 Telephone (202) 624-5800

FOLLOW-UP QUESTIONS FOR THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS

1. The 1962 AASHO Road Test found that a fully loaded tractor-trailer-semi combination does the same amount of pavement damage as it takes 9,600 cars to cause. The recent DOT cost allocation study uses a ratio of approximately 1 to 18. Do you believe this is a conservative estimate?

2. How much of pavement wear is due solely to environmental conditions and how much seems to be an axle-load/environment interactive process?

3. Since the highway program is increasingly shifting in emphasis from new construction to repair and rehabilitation, which do you believe is the better choice in determining cost responsibility--the incremental method or the consumption based approach?

4. You have submitted recent cost allocation studies from seven States. How were pavement 4R costs allocated in those studies?

5. At present several other states have cost allocation studies underway. There has been concern expressed that the Federal DOT study may be simply adopted for use at the State level. Do you see that happening or are States tailoring their studies to their own needs?

6. Do you believe inadequate maintenance has contributed to the deterioration of the roads and bridges? If so, what are the reasons for inadequate maintenance?

7. According to a complaint of the truckers, the wear based method used in the U.S. DOT study attributes all damage to vehicles even though roads would require replacement due to weather, climate and age. Why should a truck pay any more than a car does for costs attributable to these factors?

8. The recent Federal cost allocation study found a large cross subsidy among trucking vehicle classes. Given their relative cost responsibilities, heavy combination trucks appear to underpay while the lighter trucks overpay. Would you agree or disagree with this finding?

9. The Federal study has been criticized as being biased against heavy trucks. In addition, there have been charges that the study is based on untried and unsound engineering and economic principles. What is your opinion?

10. The truck size and weight issue is before a number of State legislatures as well as Congress. What do you see as the major considerations in any proposal to raise size and weight limits?

11. What is the outlook for Arkansas, Missouri, and Illinois joining the remaining States in setting an 80,000 pound truck weight limit?

12. The Oregon DOT has stated, "(w)e have also observed that longitudinal cracking in pavements can either be environmentally or load caused... However, without heavy wheel loads, these cracks require little or no maintenance in Oregon's climate." Do you agree with this statement?

13. According to an AASHTO report, Caltrans has compared two freeways during a 35 year time span, with both freeways having similar pavement thicknesses. One had basic travel only while the other carried mixed traffic including many heavy vehicles. The mixed traffic freeway required many repairs while the other freeway required little or no maintenance. To what would you attribute the difference in performance of these pavements?

14. Both Arkansas and Louisiana DOTs have asked truckers to use the left lanes on certain Interstate highways. What is intended to be accomplished by such a request?

15. Several States have implemented a weight distance tax on heavy trucks. What are the advantages and disadvantages of this kind of user tax?

16. Several States have implemented a differential gasoline and diesel fuel tax. What do you see as the advantages of such a tax structure?

17. Several States have implemented an indexed tax. What has been their experience with indexing?

18. What is your view of the States participating in the collection of certain Federal excise taxes such as the truck use tax?

19. What effect would increasing only the Federal gas tax have on the equitable distribution of costs among the user classes?

20. Do you believe the AASHTO "Interim Guide for the Design of Pavement Structures" needs to be updated? Are the pavement thickness guidelines adequate for current traffic volumes and weights?

21. What do you believe are the major causes of bridge deterioration?

22. If some of the highway responsibilities are returned to the States, will small States or those States with large land areas but small populations be able to generate sufficient revenues to support these programs? Will provisions have to be made for a transition period even if additional revenues are returned to the States along with the additional programs?

23. AASHTO testified about States' difficulties in meeting the costs of highway maintenance, not only on the Interstate and bridges, but also on the urban and secondary systems. What are the States doing to enhance their ability to finance their share of these needs?

25. At our Washington hearings, we heard testimony from one State DOT director about what he termed "...the serious difficulties resulting from the wide disparity between apportionment and actual obligational authority." Is this a concern other State DOTs share?

26. There have been some opinion polls done recently on what the public thinks of current road and bridge conditions and highway financing issues. How receptive do you think the public would be to increases in the Federal user charges?

27. AASHTO testified last month that it was not yet fully prepared to comment on the Final Report of the U.S. DOT cost allocation study. Has an initial review been completed by AASHTO as of yet, and if so, what are the conclusions?

By Harold C. King, Commissioner,
Virginia Dept. of Highways and Transportation

FOLLOW-UP ANSWERS FOR THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS

1. This question relates specifically to pavement cost assignment; while in terms of 18-Kip equivalents a fully loaded combination is assigned a design value based on the 1972 AASHO Interim guide for Design of Pavement Structures direct application of such factors to assign cost is rather simplistic. The 1982 federal cost allocation recommended approach is not too conservative and is quite defensible.

2. The question of environmental effects of pavement damage is debatable. It is totally an empirical question and very little data exist. The approach taken by the 1982 study is reasonable in that it draws from the knowledge of experts in a number of states.

3. The 1982 consumption approach is better. Not only state of the art engineering suggest such an approach but so does economic analysis.

4. In Virginia's study, costs equivalent to weight related portions were allocated by each vehicle class's proportion of equivalent single axle loads on the highway system.

5. Given AASHTO's involvement with FHWA in the development of a state cost allocation study guide, such an occurrence isn't at all likely.

6. Inadequate maintenance can certainly contribute to the deterioration of roads and bridges. In Virginia, maintenance necessary to protect the investment in our highways and bridges has been emphasized, and we do not believe that inadequate maintenance has been a significant factor in our road and bridge deterioration.

7. The truck lobby has incorrectly interpreted the 1982 FHWA study. However, there are numerous ways of allocating environmental costs -- by vehicle miles of travel (biased against cars), number of vehicles, ton miles, equivalent single axle loads, etc.

8. The empirical results of the FHWA study are consistent with the methodology employed. That is the only legitimate way it can be judged. The rather flat tax structure for vehicles weighing greater than 20,000 pounds is the culprit.

9. Our opinion is that the 1982 study by FHWA is state of the art; FHWA had no bias against the trucking lobby. They offered caveats where appropriate but their approach is overwhelmingly scientific. As far as economics theory is concerned, one could probably defend higher user charges for trucks.

10. The truck size and weight issue indeed represents a major area of concern for state legislators as well as Congress. The equity question seems to be the major consideration as difficult decisions must be made as to the continued increase in size and weight versus the exponential increase in roadway and bridge deterioration.

10. (Continued)

Funds are not available to offset current deterioration, and to establish size and weight limits more permissive than the existing limits would certainly adversely impact facilities and place more of a burden on available resources.

It is felt that the most equitable solution would be in the form of achieving uniform application of size and weights at current levels and not in the continuation of trends of periodically increasing size and weights.

11. Not applicable.

12. Oregon's statement relates directly to question No. 2 (environmental damage). As indicated earlier, it is an empirical question, and knowing the people from Oregon, I would guess they have data to support the statement. Opinions unsupported by data tend to be irrelevant.

13. Such questions really are anecdotal in nature and in fact beg for a preconceived answer. There is too little information supplied to give a defensible answer; however, if one is to provide a defensible answer, he must know something about original pavement designs, soil conditions, whether the pavement was flexible or rigid, whether they were of identical age, what their design life 18 Kip equivalents were, and how the environment varied for the two pavements.

14. Not applicable.

15. One could write a dissertation on this question; but simply put, such a tax ranks high based on economic theory because if the tax were based on axle weight, it could provide incentives to the trucking industry to spread payloads over more axles thus reducing equivalent single axle loadings and conserving pavement serviceability. Administrative and auditing costs may be high but the benefits from such a tax structure could legitimately be expected to far exceed the costs.

16. A differential diesel tax is an attempt to exact a "damage payment" against truckers; however, it is a poor attempt since fuel efficiency does not vary significantly by axle load in heavy weight categories.

17. Indexing is simply a way to try to maintain the purchasing power of the construction tax dollar. It is largely irrelevant to the cost responsibility question.

18. The federal view tends to be simplistic in the sense that they underestimate the cost of transferring this responsibility to the states. That does not mean it is not a reasonable alternative, but such taxes are not use related.

19. Without other tax changes, the payments would not track costs any better than currently; however, it would significantly change revenue collection.

20. Yes, the "Interim Guide for the Design of Pavement Structures" does need to be updated -- Flexible Design Nomographs specifically.

No, the pavement thickness guidelines are not adequate for current traffic volumes and weights. Flexible Design Nomographs need to be extended to cover equivalent daily 18 Kip axle loads (LSAL-18) in the range of 3,000 to 7,000 + per day. Also, structural number curves need extending.

21. There are two major causes of bridge deterioration: age and salt usage. There are many structures, particularly on the Secondary System, that have gone far beyond their design life. While these structures have received adequate maintenance, natural deterioration has occurred which is beyond the scope of maintenance. Salt usage on Interstate and Primary routes has promoted premature deck deterioration. Through maintenance we have attempted to waterproof many decks, and this has arrested the deterioration.

22. The Commonwealth of Virginia supports in principle the concept that the Federal Government relinquish programs which are not of national significance to the states provided the attributable revenue or equivalent portion of the existing federal tax are provided to support these programs. Without such funding the smaller states could not generate sufficient revenue to support the programs.

23. Virginia law requires the Highway and Transportation Commission to budget for highway and bridge maintenance needs as a matter of first priority, to ensure preservation of the existing system before allocating funds to construction or reconstruction projects. The 1982 session of the General Assembly enacted a three per cent oil company exise tax and increased several highway-user fees to provide an estimated $131 million annually in additional funds, thus providing sufficient money to meet essential maintenance needs while at the same time shoring up the construction/reconstruction budget.

24. Did not receive a question.

25. The disparity between apportionment and obligation authority imposes serious difficulties for the states in their budgetary and programming functions. As of September 30, 1982, the Commonwealth had a zero obligation authority balance, with an apportionment balance in excess of $110,000,000. It is most difficult to explain to legislators and citizens that the Commonwealth's entitlement is not available for critically needed highway improvements. Such impugns not only the state but also the federal budgetary and programming processes.

26. Virginia voters did not oppose House Bill 532.

27. AASHTO is working on this and John Kemp asked for volunteers at the first meeting of the State Cost Allocation Study Guide Committee Meeting in September.

By Robert N. Hunter, Chief Engineer
Missouri Highway + Transportation Commission

RESPONSE TO QUESTIONS DEVELOPED BY THE SENATE SUBCOMMITTEE ON TRANSPORTATION, COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

1. The 1962 AASHO Road Test report makes reference to ratio of 9,600 cars to one truck, but this applied to a specific pavement thickness of six inches and should not be considered valid for other pavement designs. We are unable to locate the reference to the ratio of 1 to 18 in the "Final Report on the Federal Highway Cost Allocation Study", and therefore have no comments regarding the validity of such a ratio.

2. We do not have the data available to give a definitive answer to the question. We believe that pavement wear (damage) is predominately caused by a combination of three factors, heavy axle-load, environment and a combination of heavy axle-load/environment. The damage caused solely by environment (without axle load) is believed small in moderate climate, however the effects become greater with more severe climatic conditions and are also dependent on the type of pavement, i.e. asphalt or concrete. Pavement damage due to environment is greatly accelerated by heavy axle loads while little damage results from light axle loads such as automobiles.

3. We assume the consumption (cost occasioned) base approach refers to the Federal Cost Allocation Study approach which is the better choice in determining cost responsibility. It allows a greater portion of the costs to be allocated to specific vehicle classes based on design features and maintenance expenditures.

4. These 4R costs (pavement maintenance) were included in Missouri's Cost Allocation Study as maintenance needs and were distributed on the ton mile basis.

5. The Federal method (cost occasioned) could be used for individual State studies. Each State would have to use data related to its local conditions. The Federal study could not be used for the State study.

6. The lack of funds has resulted in reduced levels of maintenance which contribute to acceleration of deterioration of the roads and bridges. This deferred maintenance results in greater overall costs to the highway system and shortens its service life.

7. The effects of weather, climate and age must be considered over a longer time period than the effects of vehicles. We believe the effects of weather, climate and age during the service life of a structurally adequate roadway are not significant compared to vehicle effects.

8. We agree. Almost all cost allocation studies we have reviewed, regardless of methodology used, indicate the same cross subsidy.

9. The cost occasioned method of allocating pavement costs appears reasonable. Some questions could occur in the assignment of other cost or methodology but bias against one class of vehicle is not evident.

10. We see at least the following three major considerations in any proposal to raise the size and weight limits:

    a. We believe there is a general opinion that safety is a vital concern in increasing size and weight because of more space occupied by larger vehicles, especially in relation to narrow pavement and narrow bridges, and more distance is required for stopping heavier vehicles.

    b. A major consideration is the excessive and additional damage that will result to existing bridges and roads built to accommodate lesser weight vehicles.

    c. The need for additional truck fees to pay for higher damage to existing roads and bridges and also additional cost of constructing new adequate facilities.

11. The Missouri Highway and Transportation Department is not opposed to the 80,000 lb. truck weight limit provided truck registration fees are established commensurate with proper cost allocation. No doubt there will be continued legislative action in Missouri to raise the legal maximum weight to 80,000 lbs., and if the proposal includes the establishment of a realistic fee schedule, it is reasonable to assume that such limit will ultimately come to pass in our State.

12. We agree with the Oregon DOT conclusion since maintenance of cracks is related to filling the cracks to prevent water intrusion which leads to pumping and displacement of foundation material under heavy loads. Without heavy loads, the pumping and subsequent breakup of pavement is a minor problem.

13. We would attribute the difference in performance of two pavements to the damaging effect of heavy vehicles on the mixed traffic freeway.

14. We understand that Arkansas and Louisiana feel that they can extend the life of the pavement a few years since the right lane is used by more vehicles including heavy trucks and is showing more wear. However, the safety aspects are unknown and may present some problems.

15. The advantage of weight-distance taxes is that it would be a more equitable method of taxing the road user. The disadvantage is the difficulty of administering this type of tax.

16. Since diesel engines are more efficient, the amount of tax per mile from motor fuel would be closer with a differential tax between diesel and gasoline.

17. Missouri has no experience with an indexed tax.

18. Much depends on the rules and regulations. If it could be done without imposing undue Federal rules on the States and if collection costs were paid for by the Federal government, it would be acceptable.

19. If only the Federal gas tax (diesel) was increased, it would be impossible to equitably distribute costs among the user classes.

20. The AASHTO Interim Guide for design of pavement structure is based on a specific set of materials and one subgrade, a single environment and an accelerated procedure for accumulating traffic. As such it was emphasized that the guide should be considered as interim in nature and subject to adjustment based on experience and additional research. The guide was originally prepared in 1972 with latest revision in 1981. The guide as revised is adequate for current traffic volumes and weights when used as intended.

21. Some of the major causes of bridge deterioration include the following:

    a. Heavier and more numerous vehicles. Vehicle weights have increased over the years, and many of the older bridges were not designed for weights and volumes now being experienced.

    b. The increased use of chlorides has had some adverse effect on bridge decks.

    c. Economy of design with heavy loads has increased the problem.

22. If the highway financial responsibilities being returned to the states are in fact primarily intra-state roads, the revenues generated at the state level should be expected to eventually support those roads. A transition period should be provided in order to give state legislatures time to assess the problem and to act accordingly.

23. Most states have increased user taxes periodically. Missouri fuel taxes have more than doubled during the last 20 years and an additional increase is currently being considered.

25. Yes, we have concerns because of the disparity. Obligation authority is not needed because Congress has control through the development of the authorizations of apportionments.

26. We have no factual basis to comment regarding public receptivity of proposals to Federal user fee increases, but it is our opinion that Congress must face this issue without consideration of whether the increases are palatable to the public.

27. We are not aware of any official AASHTO position regarding the Final Report of the U.S. DOT cost allocation study.

By John B. Kemp Secretary
Kansas Department of Transportation

Responses to follow-up questions from the American Association of State Highway and Transportation Officials.

1. Kansas is only beginning a phase of its first cost allocation study which would address the question of allocations based upon empirical data. Therefore, we cannot answer the first question.

2. Kansas has no data to answer this question.

3. Kansas believes it is inappropriate to state that either the incremental or the consumption-based approach is the best choice in determining cost resonsibility. Rather, we feel that both have merits for different kinds of highway improvements. For example, the incremental method appears superior for construction on new alignment; the consumption-based approach is most appropriate for rehabilitation on existing alignment.

4. Kansas has no response.

5. Currently, an AASHTO committee is involved in a project to produce a cost allocation guide useful to the various states. While the guide uses research from the federal study, it will be written to address the needs and characteristics of the individual states, rather than those of the federal government. A number of the participants in this task force are from states that have already performed cost allocation studies. There is no indication that those states will discard their own studies in favor of adopting the federal approach.

6. The concept of "adequate" and therefore "inadequate" maintenance is rather difficult to grasp. Roads and bridges have deteriorated in many cases because actual traffic has far exceeded design traffic, or age has taken the roads and bridges past design life. Inadequacy of funding has allowed further deterioration as existing funds are used to "stretch" system life.

7. Federal research developed pavement distress models which show pavement distress as an exponential function of axle loads. That data indicates that the additional weight causes both deterioration itself and aggravates environmentally caused distresses. A roadway with a saturated subgrade will be rutted quicker by a heavy load than by a lighter load.

8. Kansas has no data to address this question.

9. A choice of methodology often has implications for the way results will turn out. It would appear that the federal study has presented sound conceptual arguments for the methodologies chosen--therefore, the results should be measured against the arguments stated rather than whether the results tend to make one class pay more or less. It should be noted that the federal study generally follows the methodological guidelines set forth by the Congressional Budget Office as directed by the Congress itself.

10. Major issues involved in raising size and weight limits on larger vehicle classes primarily focus on two aspects:

    (a) Safety of the system would be diminished by an increased width and length. The increased width proposal from 8' to 8'6" would accentuate existing traffic conflicts. Many existing pavements and bridges are not full design width. In addition, a length increase beyond that for which existing intersections and ramps were designed will increase off-tracking with the result of curb-jumping, shoulder deterioration, and sign damage.

    (b) Design life of existing structures. That is, structures are designed for a given life based upon anticipated loading and traffic. In most cases, in recent years, the design life has based upon the 80,000 lb. vehicle as the maximum vehicle with given weight and size limits. Changes to those in an upward direction will obviously cause more structures and pavements to now be "deficient." Even more critical would be adjustments upward in axle loading.

11. Kansas has no response.

12. We are not familiar with Oregon's climate, therefore we cannot respond to the question. However, some KDOT engineers have observed serviceable residential streets with wide cracks that have not been maintained for years.

13. The amount of wear (as measured in 18,000 lb. equivalent single axle loads) would have been much higher on the mixed traffic freeway and had probably reached the end of its design life.

    The basic travel freeway, on the other hand, had not used its design number of 18,000 lb. equivalent single axle loads and has not yet reached the end of its design life.

14. Although Kansas has no direct knowledge of the decisions made by the Arkansas and Louisiana DOT, it would appear that the purpose of the request is to equalize pavement loadings, and hence deterioration, of all lanes of its interstate. This would then allow, in the long run, that both lanes wear out at the same time and can be rehabilitated at the same time. However, if accidents increase as a result, total economic costs might increase.

15. The advantage of a weight distance tax is that that tax is more directly related to weight and distance traveled than any other tax mechanism currently used by the states or the federal government. The disadvantage of that particular tax is that it is one of the more difficult taxes to collect and enforce.

16. Kansas has had a differential gasoline and diesel tax since January 1, 1956. The differential tax was a part of a tax package which deleted a ton-mile tax, added a differential tax, increased truck registration fees, etc.

The advantage of a differential tax is that the fuel economy difference between gasoline and diesel is acknowledged. In addition, the differential tax allocates charges to diesel-fueled vehicles which are generally the heavier truck combinations.

17. Kansas highway user fees are not indexed. There have been a number of proposals studied and introduced during legislative sessions. Review of the fiscal estimates that accompanied these proposals indicates the revenues would have fallen short of the estimates, had the bills passed. It appears that KDOT would still have achieved additional revenues, however, even though less than forecast.

18. The state of Kansas imposed a ton-mile tax on motor carriers from 1931 to 1956. The 1955 Kansas Legislature replaced the ton-mile tax with a "tax package" which included, among other items, a special fuels tax on diesel fuel.

    Based on its replacement of a ton-mile tax with alternate taxes, it is doubtful that Kansas would be interested in collecting a federal truck use excise tax. However, incentives for such collection might influence a policy change.

19. All other things being equal, an increase in fuel taxes would shift additional costs to cars.

20. Kansas uses the AASHTO formulae for equivalent axle loadings contained in the AASHTO "Interim Guide for the Design of Pavement Structures" in its design practices. The pavement thickness guidelines are still adequate for current traffic volumes and weight. We have not experienced difficulty with the existing guide.

21. Heavy loads contribute significantly to deterioration of steel structures. However, heavy loads are not a significant contributor to concrete structures.

    Bridge deck deterioration is primarily caused by surface spalling down to the top layer of reinforcing steel. The surface spalling is aggravated by age, traffic abrasion and snow and ice removal chemicals.

22. It is not likely that the states in question would be able to generate sufficient additional revenue to support the programs turned over to them to the level of priority deemed important at the federal level as evidenced by current federal funding. If additional federal aid comes with the turn-over (not "return") of responsibility to the states, then it is possible that the federal priority could be maintained. It does not appear likely, however, that the states would receive the same amounts as those expended at the federal level to include federal program administration and overhead costs. In any case, a transition period would be required.

23. The Kansas DOT has improved its maintenance management through:

    1. Establishing levels of service.

2. Prioritization and optimization techniques.
3. Centralized planning and scheduling.
4. Longer time periods between maintenance cycles.
5. Elimination of non-essential activities.
6. Substantial decrease in maintenance personnel.
7. Development of design and construction practices contributing to reduced maintenance.

In addition, the Kansas DOT has placed emphasis on educating the general public and the legislature through public hearings, speeches, tours, reports, etc., for the purpose of receiving additional funding.

24. Deleted.

25. Yes, for the following reasons. Programming and scheduling is a long-term process. When the process is subjected to short-range disruptions, the orderly programming and scheduling process is also disrupted. It causes a hurry up and wait, feast or famine type program resulting in inappropriate construction scheduling (summer-type work let in the fall and completed under less than favorable climatic conditions). In addition, it causes the construction industry considerable stress in maintaining a balanced work load.

26. The Congressional committees conducting hearings would have a better perspective to answer this question than would a state.

27. This question should be answered by the AASHTO Headquarters Office.

NEW HAMPSHIRE

RESPONSE TO ADDITIONAL QUESTIONS
RAISED BY SENATOR STEVE D. SYMMS

1. The ratio of 1 to 18 used in the recent DOT cost allocation study should be considered very conservative.

2. Pavement wear to some extent can be attributed to environmental conditions but, the greatest impact is the axle load/environmental interaction. The resulting wear and break-up of the pavement can be attributed to the heavier trucks and they should be paying their fair share of the costs to repair or for the costs of the original pavement structure to insure that the break-up will not occur.

3. Although there is a shift in emphasis toward repair and rehabilitation, there is still a need for additional roads and the expansion of existing facilities to handle increased traffic volumes and loadings. The best choice for determining cost responsibility is the modified incremental method also known as the minimum pavement thickness method.

4. No comment since N.H. was not one of the States submitting a cost allocation study.

5. N.H. has not done a cost allocation study. It should be kept in mind that N.H. as well as the majority of other States look to the Federal Government for guidance. The Feds rely on the AASHTO criteria which are acceptable by the vast majority of States, so therefore the end result will or should be a method developed by agreement between the States, AASHTO and the Federal agencies.

6. Yes, inadequate maintenance has resulted in deterioration of roads and bridges but as everyone in the highway field knows the main reason for this is the inability of the States to be able to raise sufficient funds to carry on a comprehensive mainteance program.

7. The roads are having to be replaced sooner and more often than anticipated due to heavier repetitive axle loads caused by trucks. If environmental conditions were the only factor we would not have such high replacement and repair costs.

8. N.H. agrees that heavier trucks are underpaying their cost responsibilities.

9. N.H. believes that the Federal study was not biasedagainst heavy trucks.

10. Truck sizes and weights should not be increased but in any consideration given to doing this the prime issue should be what impact increasing the size and weight will have on roadway life.

11. It is N.H.'s understanding that Missouri has set an 80,000 pound truck weight limit and we expect that Arkansas and Illinois will follow.

12. Yes, we agree with the statement from the Oregon DOT.

13. The differences in performance of the pavements in the Caltrans study can be attributed to axle loads and frequency of the repetitive loads.

14. Apparently Arkansas and Louisiana are trying to balance the pavement wear in the several lanes of travel.

15. Administratively the collection of a weight distance tax is a nightmare. This type of tax should be a State option and should not be mandated by the Feds.

16. If the diesel fuel tax is higher than the gasoline tax, it is probably an attempt to make the vehicles which are causing the damage pay their fair share.

17. N.H. has no experience with an indexed tax.

18. N.H. is opposed to having the States participate in the collection of Federal excise taxes since it involves the hiring of additional personnel during a time when the Legislature is opposed to increasing State forces. Also, the States are not going to be sure what is going to be returned to them and with what restrictions.

19. It would take more than an increase in the gasoline tax to make an equitable distribution of cost responsibilities since most heavy trucks run on diesel fuel.

20. The AASHTO guide needs updating and this is now underway.

21. In this part of the Country, it is a combination of loading and environment (salting in winter months because of the high snow fall).

22. Small States such as N.H. will have a great deal of difficulty raising sufficient funds to carry out existing programs. Certain features such as guaranteeing 1/2% monies must be maintained. Should the Feds decide that the States will be responsible for the programs then a transition period must be put into play and adequate warning must be given to allow the State Legislative bodies to take the appropriate action (preferably 4 years).

23. There is not much the States can do but raise taxes and this has become a very unpopular issue. N.H.'s Legislature has authorized and implemented a temporary increase (3¢/gallon) in the gasoline tax (to last 2 years) but we are not sure what will happen in the next Legislative session. The last Federal increase in a gas tax was 1959 which appears to be totally unrealistic.

25. The issue of obligation limitation has had a disasterous effect on N.H. We have plans ready but cannot implement. Several grant funds or allocations from the Secretary's Discretionay Fund to the State of N.H. were included in our obligational limitation. This has had an horrendous effect on N.H. Obligational limitation is our number one problem.

26. The public will not welcome any changes in any taxes but given all the facts they are intelligent enough to understand the need for the increases as witnessed by the action of 37 States in increasing their taxes for highway purposes.

27. AASHTO is in the review process and will meet on October 20-21, 1982 in Orlando to attempt to come to a conclusion.

August 17, 1982
Robert N. Hunter
Chief Engineer
Missouri Highway and
Transportation Department

FOR TESTIMONY TO THE
SUBCOMMITTEE ON TRANSPORTATION
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

August 18, 1982

The items to be addressed are:

1. The condition of the Federal-Aid highway system and factors affecting the service life of the system.

The Federal-Aid System in Missouri carries 82 percent of all travel in the state. It accounts for 83 percent of the mileage and 98 percent of the travel under the jurisdiction of the State Highway and Transportation Department. With limited state funds, the amount of federal-aid funds available materially affects the level of travel in Missouri.

The surface condition of the federal-aid highway system in Missouri has been deteriorating at a faster rate than can be maintained with the present funding level. Our records indicate that concrete pavements should be rehabilitated or resurfaced every 25-30 years and that asphalt surfaces should be rehabilitated or resurfaced about every 15 years. The present revenues from both federal and state sources provide only about half the revenue necessary to maintain Missouri's highway system at an acceptable level. Between 1970 and 1980 traffic volumes in Missouri increased 32 percent. If we are to maintain the same level of service, additional improvements must be made.

Bridges represent a large amount of the highway needs. Unfortunately, Missouri has a very high ratio of structurally deficient and functionally obsolete bridges. At the present time we are replacing about 15 bridges per year. Based on a bridge life of 60 years, we need to replace over 100 bridges per year. In addition, a similar number of bridges need to be redecked each year.

There are also many areas in the state that are developing and need improved roads to handle the increased traffic. Assistance must be provided for all types of traffic needs. We must not only maintain our system but must provide the improvements to serve the traffic in the developing areas.

Above all, we must maintain our existing system. Without surface condition improvements, maintenance cost increases at an accelerating rate with little improvement in riding surface.

2. The needs of the Federal-Aid Highway system versus the existing revenues coming into the Highway Trust Fund.

The 1982 federal-aid regular apportionment to Missouri amounted to approximately 131 million dollars. Discretionary federal funds provided an additional 20 million for a total of 151 million. To properly maintain the state system and to complete the interstate system, the federal-aid revenue to Missouri should be approximately 310 million dollars annually. This is based on present dollars and does not take into consideration inflation that will affect future buying power.

The more efficient engines in automobiles have caused a decrease in the revenue from the motor fuel tax but the biggest problem to overcome in highway finance is inflation. Between 1970 and 1980 the national construction indices increased at an annual rate of 10.8 percent. What one dollar could buy in 1970 costs $2.79 in 1980. This decrease in purchasing power makes it very difficult to maintain the highways without an increase in revenue. As you know, revenue has not increased, and the highways have deteriorated accordingly. We are not recommending a big highway program as was initiated at the start of the interstate system. All we are requesting is that sufficient funds be provided to enable us to maintain the highway system at an acceptable service level.

3. The allocation of the highway costs among the various user classes.

Highway costs should be allocated to the various vehicle classes so that each user pays their fair share. Under the present Federal tax structure, there is no graduation in the tax rate for the various vehicle classes. Heavier vehicles pay more by the fact they weigh more. This is a simple linear or straight line ratio. Tests for heavy loads on roads have shown that pavement damage and the reduction in the life of a road progresses much faster than a straight line. The tax structure for the various classes of vehicles should take this into account. We are encouraged that the recently completed federal highway cost allocation study proposes a graduated rate for vehicle weight groups.

4. Proposals to change the structure of the highway user fees.

In our state we have examined a number of road tax alternatives, and after much deliberation, it was decided to return to the traditional highway user fees. Truck fees in Missouri are on a graduated rate, and as we have said earlier, we feel it would be wise to do likewise on the Federal level.

Many needs studies have been done in Missouri in the last ten years, and they all indicate that highway revenue should be at least doubled based on today's dollars. Many procedural requirements including those based on environmental issues, social programs, and others have been added to the road program in the last decade or two. These requirements have resulted in considerable additional costs, but no additional funds have been made available. As you know, the Federal fuel tax has not been increased since 1959. As we have attempted to accomplish the necessary road improvements together with these expensive additional requirements with essentially a fixed level of funding in an inflationary period, a considerable backlog of badly needed work has developed. Further delay will result in an accelerating deterioration of the system. Should this happen, it will cost 3 to 7 times as much to repair the system.

To summarize our concerns, we are asking that the federal revenues be increased to at least double the amount now being apportioned to the states and that taxes be assessed equitably among the various vehicles.

STATEMENT BEFORE SUBCOMMITTEE ON TRANSPORTATION OF THE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

AUGUST 18, 1982

HIGHWAY FUNDING NEEDS

COMMISSIONER HAROLD C. KING
VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION

ALLOCATION OF HIGHWAY COSTS AMONG USER CLASSES

WILLIAM E. LANDSIDLE
DEPUTY SECRETARY OF TRANSPORTATION
COMMONWEALTH OF VIRGINIA

IT IS A PLEASURE TO BE HERE TO DISCUSS THE HIGHWAY NEEDS IN THE COMMONWEALTH OF VIRGINIA.

LAST NOVEMBER MY STAFF DEVELOPED A CRITICAL IMPROVEMENT PROGRAM WHICH IDENTIFIED IN EXCESS OF $3 BILLION OF HIGHWAY NEEDS IN THE COMMONWEALTH OVER THE SIX-YEAR PERIOD FROM FISCAL YEAR 83 THROUGH FISCAL YEAR 88. THIS ASSESSMENT DID NOT INCLUDE ALL THE NEEDED FACILITIES, BUT ONLY THOSE REGARDED AS MOST CRITICAL. WE KNEW THAT MORE STATE FUNDS WOULD BE REQUIRED TO CARRY OUT A REASONABLE PROGRAM. IN FACT, WITHOUT ADDITIONAL REVENUE WE WOULD HAVE HAD NO CONSTRUCTION PROGRAM IN FISCAL YEAR 1985.

THE REVENUE SHORTFALLS ANTICIPATED IN THE CRITICAL IMPROVEMENT PROGRAM RANGED FROM $172 MILLION IN FISCAL YEAR 83 TO $400 MILLION IN FISCAL YEAR 88 TO ACCOMPLISH THE PROGRAM AS OUTLINED. THE VIRGINIA GENERAL ASSEMBLY TOOK THE VERY COURAGEOUS ACTION OF APPROVING THE LARGEST SINGLE TRANSPORTATION REVENUE TAX INCREASE EVER APPROVED IN THE COMMONWEALTH. FOR THE COMING BIENNIUM, WE ANTICIPATE THE ADDITIONAL REVENUE WILL BE APPROXIMATELY $263 MILLION, WHICH, WHILE SHORT OF THE AMOUNT IDENTIFIED IN THE CRITICAL IMPROVEMENT PROGRAM, WILL PERMIT A LIMITED CONSTRUCTION PROGRAM AND WILL RESTORE A REASONABLE LEVEL OF STABLILITY.

OUR NEEDS ARE PARTICULARLY PRONOUNCED ON THE INTERSTATE SYSTEM, THE PRIMARY SYSTEM, AND BRIDGES. FOR EXAMPLE, VIRGINIA RECEIVES APPROXIMATELY $120 MILLION IN INTERSTATE APPORTIONMENT ANNUALLY, YET OUR MOST RECENT ESTIMATE TO COMPLETE THE INTERSTATE SYSTEM IS $1.7 BILLION. OF THIS NEED, APPROXIMATELY $500 MILLION IS FOR CONSTRUCTION OF

THE ROUTE 664 TUNNEL CONNECTING THE CITIES OF NEWPORT NEWS AND SUFFOLK IN THE HAMPTON ROADS METROPOLITAN AREA.

UNDER EXISTING LEGISLATION, WE ANTICIPATE RECEIVING APPROXIMATELY $25 MILLION ANNUALLY IN FEDERAL BRIDGE REPLACEMENT FUNDS. SOME 1,240 BRIDGES ON OUR FEDERAL-AID HIGHWAY SYSTEM ALONE ARE FUNCTIONALLY OBSOLETE OR STRUCTUALLY DEFICIENT AND MUST BE REPLACED AT THE COST OF HUNDREDS OF MILLIONS OF DOLLARS. IN ADDITION, THE ROBERT E. LEE BRIDGE IN THE CITY OF RICHMOND ESTIMATED TO COST $70 MILLION, THE CAMPOSTELLA BRIDGE IN THE CITY OF NORFOLK ESTIMATED TO COST $25 MILLION, THE WILLIAMS VIADUCT IN THE CITY OF LYNCHBURG ESTIMATED TO COST $40 MILLION, AND A NUMBER OF OTHERS FOR WHICH THE REPLACEMENT COST EXCEEDS $10 MILLION MUST BE REPLACED. THESE NEEDS OBVIOUSLY CANNOT BE MET UNDER THE EXISTING BRIDGE REPLACEMENT PROGRAM. WHILE THE $28 MILLION RECEIVED FROM THE BRIDGE DISCRETIONARY PROGRAM OVER THE PAST SEVERAL YEARS HAS HELPED SUBSTANTIALLY, AN URGENT NEED EXISTS TO INCREASE FUNDING FOR THIS CATEGORY.

In addition to the need for an increased apportionment, I should also mention the serious difficulties resulting from the wide disparity between the apportionment and actual obligational authority - - our Highway and Transportation Commission must allocate total funds expected to be available and, therefore, creates expectations on the part of the General Assembly, local governments, and the public that such a federal program will be forthcoming. As of this morning, we had an apportionment balance of $113 million for which obligation authority has not been received. This situation, which we cannot control, has led to widespread misunderstanding and distrust of our highway funding procedures.

We would also favor the reduction in the number of funding categories.

The Virginia Highway and Transportation Commission in July approved the Six-Year Improvement Program which fully obligates all federal funds expected through fiscal year 88.

THE DEPARTMENT IS STRICTLY ACCOUNTABLE FOR PRODUCING THE WORK OUTLINED IN THIS PROGRAM, AND YET, AS OF TODAY, WE HAVE EXHAUSTED EVERY PENNY OF THE FEDERAL OBLIGATION AUTHORITY AVAILABLE AND MUST THEREFORE CONTINUE TO FINANCE WORK WITH STATE FUNDS UNTIL ADDITIONAL OBLIGATION AUTHORITY IS RECEIVED.

WE HAVE APPROXIMATELY $60 MILLION WORTH OF WORK THAT COULD BE ADVERTISED FOR CONTRACTORS' BIDS IN SEPTEMBER WERE THE OBLIGATION AUTHORITY AVAILABLE, AND HAVE REQUESTED DISCRETIONARY FUNDING THROUGH THE FEDERAL HIGHWAY ADMINISTRATION. IF WE ARE NOT SUCCESSFUL IN OBTAINING ADDITIONAL OBLIGATION AUTHORITY, OUR PROGRAM WILL SLIP AT LEAST ONE MONTH, AND I SHUDDER TO THINK OF THE SLIPPAGE WHICH WOULD RESULT WITHOUT NEW FEDERAL-AID HIGHWAY LEGISLATION.

IN ADDITION TO THE VERY SIGNIFICANT ACTION TAKEN BY OUR GENERAL ASSEMBLY DURING ITS LAST SESSION, MANY OF OUR URBAN JURISDICTIONS, PARTICULARLY THE URBAN COUNTIES, ARE SEEKING TO HELP THEMSELVES WITH OUR HIGHWAY PROBLEMS.

Parallel lanes to the Dulles Access Road are being developed with toll funding; Chesterfield County, in the Richmond area, is studying the possibility of developing a $90 million freeway with toll revenues, and Fairfax County has recently sold $30 million worth of bonds for application to their secondary road program.

In summary, I believe that the state and local governments have recognized the critical crossroads for the highway program and have taken bold actions to respond. We would certainly encourage favorable consideration by this Committee, and by the entire Congress, for additional funding for those facilities of federal interest and for the simplification of the delivery process.

The Virginia General Assembly's Joint Legislative Audit and Review Committee in 1982 also tackled the very difficult question of cost responsibility, and I have

MR. WILLIAM E. LANDSIDLE, DEPUTY SECRETARY OF TRANSPORTATION, HERE TODAY TO TESTIFY ON THE ISSUE.

DR. GARY ALLEN OF OUR HIGHWAY AND TRANSPORTATION RESEARCH COUNCIL, WHO WAS INVOLVED IN OUR STUDY, IS ALSO HERE TO RESPOND TO ANY TECHNICAL QUESTIONS YOU MAY HAVE.

ALLOCATION OF HIGHWAY COSTS AMONG USER CLASSES

AS I BELIEVE THE SUBCOMMITTEE IS AWARE, VIRGINIA RECENTLY COMPLETED A TWO-YEAR ASSESSMENT OF THE RELATIONSHIP BETWEEN COSTS ASSOCIATED WITH HIGHWAY USE, AND REVENUE PAYMENTS BY VEHICLE CLASS -- SOMETIMES REFERRED TO AS A COST RESPONSIBILITY STUDY. CONGRESS GAVE THE SAME CHARGE TO THE SECRETARY OF TRANSPORTATION THROUGH SECTION 506 OF THE SURFACE TRANSPORTATION ASSISTANCE ACT OF 1978.

THE VIRGINIA AND FEDERAL STUDIES FOLLOWED SIMILAR METHODOLOGIES IN ALLOCATING COSTS AMONG VEHICLE CLASSES. FOR EXAMPLE, IN THE IMPORTANT AND CONTROVERSIAL AREA OF PAVEMENT

COST ALLOCATION, WE ADOPTED THE METHODOLOGY ORIGINALLY PROPOSED BY THE CONGRESSIONAL BUDGET OFFICE AND LATER INCORPORATED IN THE SECTION 506 STUDY.

NOT SURPRISINGLY, THE RESULTS OF THE TWO COST ALLOCATIONS ARE ESSENTIALLY THE SAME. VIRGINIA ASSIGNED 63.9 PERCENT OF HIGHWAY COSTS TO AUTOS AND LIGHT TRUCKS, WHILE THE FEDERAL STUDY ASSIGNED 64.7 PERCENT TO THOSE VEHICLES. COMBINATION TRUCKS WERE ASSIGNED 26.1 PERCENT AND 27.4 PERCENT RESPECTIVELY, WHILE ALL TRUCKS, TREATED AS A CLASS, WERE ASSIGNED 37.8 PERCENT OF HIGHWAY COSTS BY VIRGINIA, AND 34.8 PERCENT BY THE FEDERAL STUDY.

IN OUR TECHNICAL STUDY, WE SET PREDETERMINED SENSITIVITY GUIDELINES WITH WHICH TO ASSESS OUR FINDINGS. THAT IS, THE STUDY TEAM AGREED THAT THE COMPLEX METHODOLOGY, COUPLED WITH DATA LIMITATIONS, WOULD INTRODUCE SOME UNCONTROLLED ERROR INTO THE ANALYSIS. WE ASSUMED THAT PLUS OR MINUS THREE PERCENT WAS A REASONABLE ERROR RANGE. SINCE THE VIRGINIA AND SECTION 506

COST ALLOCATIONS VARY BY NO MORE THAN THREE PERCENT IN ANY OF THE COMPARABLE CATEGORIES OF ANALYSIS, AND ARE WITHIN 1 1/2 PERCENT OF EACH OTHER WITH REGARD TO THE CLASSES WHICH INCLUDE AUTOS AND HEAVY TRUCKS, WE HAVE CONCLUDED THAT THERE IS NO SUBSTANTIVE DIFFERENCE BETWEEN THE FEDERAL AND VIRGINIA FINDINGS AS THEY RELATE TO COSTS.

WHILE THE COST ALLOCATION OF THE TWO STUDIES WAS COMPARABLE, THE ASSESSMENTS OF REVENUE ADEQUACY WERE SOMEWHAT DIFFERENT. THE SECTION 506 STUDY PROJECTED FOR THE FEDERAL HIGHWAY TRUST FUND THAT BY 1985 AUTOS WOULD SLIGHTLY UNDERPAY THEIR COST RESPONSIBILITY, SINGLE UNIT TRUCKS WOULD OVERPAY BY ALMOST ONE HUNDRED PERCENT, WHILE TRACTOR-TRAILERS AS A CLASS WOULD UNDERPAY THEIR ASSIGNED RESPONSIBILITY BY TWENTY PERCENT. VIRGINIA'S PROJECTIONS FOR 1984, UNDER ONE TYPICAL BUDGET SCENARIO, FOUND ALL CLASSES UNDERPAYING; AUTOS AND TRACTOR-TRAILERS BY 11 PERCENT AND 12.5 PERCENT RESPECTIVELY, WHILE SINGLE UNIT TRUCKS WERE FOUND TO BE A MAJOR PROBLEM AREA WITH UNDERPAYMENTS OF THIRTY PERCENT OR MORE.

THE RELATIVELY BETTER SHOWING OF THE LARGER TRUCK CLASSES IN THE VIRGINIA STUDY, COMPARED TO THE SECTION 506 ANALYSIS, IS DUE TO THE NATURE OF OUR TAX STRUCTURE. A TWO CENT-PER-GALLON SURCHARGE ON MOTOR FUEL USED BY HEAVY TRUCKS, MEMBERSHIP IN THE INTERNATIONAL REGISTRATION PLAN, AND A WEIGHT-GRADUATED REGISTRATION SCHEDULE ALL COMBINE TO BRING HEAVY TRUCK TAXATION IN VIRGINIA MORE CLOSELY IN LINE WITH ASSIGNED COSTS THAN IS APPARENTLY THE CASE WITH THE FEDERAL TAX STRUCTURE. CONVERSELY, THE FACT THAT IN VIRGINIA MOST SINGLE UNIT TRUCKS ARE EXEMPT FROM THE TWO-CENT SURCHARGE, AND ENJOYED SIGNIFICANTLY LOWER REGISTRATION ASSESSMENTS, CONTRIBUTED TO THE SERIOUS UNDERPAYMENT BY THOSE VEHICLES.

IN RESPONSE TO THESE FINDINGS, THE GENERAL ASSEMBLY PASSED A COMPREHENSIVE HIGHWAY TAX BILL IN MARCH OF THIS YEAR. GENERAL REVENUE ENHANCEMENTS WERE SOUGHT THROUGH AN OIL FRANCHISE TAX, AS WELL AS ACROSS THE BOARD INCREASES IN MOTOR VEHICLE FEES AND REGISTRATION ASSESSMENTS. THE REGISTRATION FEE SCHEDULE WAS ADJUSTED TO ADDRESS THE UNDERPAYMENT PROBLEM WITH SINGLE UNIT TRUCKS. THE TAX BILL, WHICH WILL INCREASE USER CHARGES IN VIRGINIA BY AS MUCH AS 25 PERCENT, WILL ITSELF BE SUBJECT

TO A FOLLOW-UP COST RESPONSIBILITY EVALUATION LATER IN THE DECADE.

IN SUMMARY, OUR RECENT EXPERIENCE WITH COST RESPONSIBILITY ANALYSIS IN VIRGINIA MIGHT SUGGEST TWO POINTS TO THIS SUBCOMMITTEE.

1. THE ALLOCATION OF COSTS IN THE SECTION 506 STUDY APPEARS TO HAVE BEEN DONE IN A REASONABLE FASHION AND IS SUPPORTED BY THE RESULTS OF VIRGINIA'S INDEPENDENTLY CONDUCTED RESEARCH IN THIS AREA.
2. THE SUBSTANTIAL UNDERPAYMENT OF COST RESPONSIBILITY ASSIGNED TO COMBINATION TRUCKS BY THE FEDERAL STUDY INDICATES THAT CONGRESS SHOULD LOOK CLOSELY AT REVENUE PROPOSALS WHICH BETTER REFLECT THE COST/REVENUE BALANCE THAN DOES THE EXISTING TAX STRUCTURE. THEREFORE, PROPOSALS TO SIMPLY RAISE THE FEDERAL MOTOR FUEL TAX ACROSS THE BOARD WOULD

SEEM TO SERIOUSLY UNDERUTILIZE THE SECTION 506 STUDY RESULTS. SOME COMBINATION OF A FUEL TAX DIFFERENTIAL, POSSIBLY COMBINED WITH A WEIGHT-GRADUATED USE TAX, WOULD SEEM TO PROVIDE A MECHANISM, SIMILAR TO THOSE EMPLOYED AT THE STATE LEVEL, TO ADDRESS THE EQUITY ISSUES RAISED BY THE SECTION 506 STUDY.

IN CLOSING MR. CHAIRMAN, I WOULD REITERATE THE POINT MADE AT THE BEGINNING OF OUR TESTIMONY. WHILE WE ARE PHILOSOPHICALLY INTERESTED IN THE APPLICATION OF EQUITY CRITERIA TO ANY CHANGE IN FEDERAL HIGHWAY USE TAXES, OUR PRIMARY CONCERN REMAINS THE ADEQUACY OF FEDERAL REVENUES AND THE MANNER IN WHICH ANY TURNBACK INITIATIVES ARE CARRIED OUT. WE IN VIRGINIA STAND READY TO ASSUME FULL RESPONSIBILITY FOR THE 52,000 MILES OF SECONDARY ROADS AND URBAN STREETS IN OUR STATE SYSTEM. WE CAN ONLY MAKE THIS COMMITMENT, HOWEVER, IF THERE IS ADEQUATE FEDERAL SUPPORT TO PROVIDE FOR COMPLETION AND NECESSARY REHABILITATION OF THE INTERSTATE SYSTEM, AS WELL AS SUPPORT FOR A REASONABLE, JOINT

FEDERAL/STATE PROGRAM OF CONSTRUCTION, REHABILITATION AND BRIDGE REPLACEMENT ON THOSE PRIMARY AND URBAN ROUTES OF INTERREGIONAL AND INTERSTATE SIGNIFICANCE.

MR. CHAIRMAN, WE ARE GRATEFUL FOR THE OPPORTUNITY TO TESTIFY BEFORE YOU TODAY AND WOULD BE PLEASED TO ADDRESS ANY QUESTIONS YOU MIGHT HAVE.

STATEMENT BEFORE THE
SUBCOMMITTEE ON TRANSPORTATION
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

Relating to

CURRENT HIGHWAY NEEDS versus EXISTING HIGHWAY REVENUES

by

JOHN B. KEMP

Secretary of the
Kansas Department of Transportation

(For Presentation on August 18, 1982)

Mr. Chairman, Members of the Subcommittee, and Staff I am John Kemp, Secretary of the Kansas Department of Transportation. You have invited me to testify today concerning the condition and needs of the Federal-Aid Highway System. I would like to address those issues from one state's - Kansas - perspective.

We in the states share problems similar to those facing you in your study of federal needs. That a problem exists can be clearly seen from the reported public input to the Highway Cost Allocation Study that: "While opinions varied on who should bear the tax burden, comments (in public meetings and from interest groups) were consistent with regard to the need for more resources for badly deteriorating roadway." The Interstate System provides a salient example: The Congressional Budget Office states that:

> "Even if the Interstate program was redesigned to place greater emphasis on completion of nationally important routes and on more repairs and less new construction these activities would require a higher level of funding than the $4.4 billion currently authorized for fiscal year 1983. Depending upon the extent and terms of federal support for upgrading projects and other work eligible for reconstruction funds, the increased financing costs could be substantial -- 30 to 130 percent or more above current authorizations." (emphasis added).

Our latest Interstate cost estimate indicates a need of about $230 million for closing remaining gaps. On the basis of our current apportionment of gap closing Interstate funds along with the State match it would take more than 9 years to complete our Interstate system. Our Interstate 4R needs are even more critical. We now have a backlog of $420 million of Interstate 4R needs. At the current rate of apportionment of IR funds it would take us 40 years to satisfy that backlog of needs, provided of course, there were neither any new needs develop nor any inflation in the next 40 years. The rest of our system fares little better.

The Kansas Federal-Aid System

There are 135,100 miles of highways, roads and streets in Kansas, making Kansas rank third in the nation in terms of the size of the road network. Kansas has over 25,000 bridges with only three states exceeding this number.

Of the total road network, 9,700 miles comprise the total state highway system with an additional 700 miles of city connecting links to the state highway system. With minor exceptions, this mileage is on one of the Federal-Aid Systems (Interstate, Primary, Secondary or Urban). An additional 21,000 miles of roads under local jurisdiction are on the Federal-Aid Secondary System and 1,300 miles on the Federal-Aid Urban System. Approximately 9,800 miles of city streets and 92,600 miles of rural roads which are not on any Federal-Aid System.

For the portion of our State highway system that excludes the Interstate system, Kansas has identified what it considers to be a need for preservation for the next 10 years that requires resurfacing 9,600 miles with a 2 inch overlay, widening 1,583 miles of pavement to 24 feet, widening of 4,607 miles of shoulders, stabilizing 1,289 miles of shoulders on highways carrying heavy traffic, replacing 323 bridges and rehabilitating 1,522 bridges. This will require more than $1.5 billion.

To place the magnitude of the state's bridge problems in perspective, it should be noted that there are about 25,000 bridges on Kansas highways, roads and streets and 1 of every 3 of these is deficient by federal safety standards.

Another way of evaluating the condition of the state system, essentially all of which is a part of the Federal-Aid System, Federal-Aid System is by a present service-ability rating for the surface. This rating system is based on a scale of 1 (poor) to 5 (very good) with a rating of 2.5 indicating a need for resurfacing. This measure indicates that 32.5% (3,140 miles) of the system rated 2.0 or less is overdue for and in urgent need of resurfacing. In addition to this, another 26.5% (2,565 miles) rated 2.5 was considered in July 1981 as pending need for resurfacing with the next 1 to 5 years. In total, nearly 59% (5,705 miles) needs resurfacing by 1986.

Factors

A number of factors have contributed to the growing Kansas, and national, need. The average age of 4,565 of our bridges on the state system is now 30 years, with over 600 more over 50 years. Vehicle size, weight, and traffic have increased, in many cases in excess of forecast. The increase in the federal maximum load limit from 73,000 to 80,000 pounds is important, as is the bankruptcy of a major grain hauling railroad. Bridge and pavements in that section of Kansas that had been served by the Rock Island have taken a particularly heavy beating.

A principal reason, however, has been the revenue problem -- escalating costs coupled with revenue bases that are unresponsive to that inflation. The history of this problem in Kansas serves to illustrate.

In December, 1975, Wilbur Smith and Associates presented their analysis of our statewide highway needs which showed a revenue need for $17.4 billion between 1975-1990. Revenues for the period were projected at $5.7 billion, creating a difference between needs and revenues of nearly $12 billion. State system needs alone were estimated to be $6.6 billion for the period with revenues projected at $2.7 billion. That difference of $3.9 billion was equivalent to a short-fall of approximately $256 million per year for the 15-year period.

The 1976 Legislature increased revenues available for highways by raising motor fuel taxes and vehicle registration fees. The 1979 Legislature further increased revenues for highways by dedicating Highway Fund interest earnings and a percentage of motor fuel gross receipts to the Freeway Fund. Between FY 1977-FY 1981, these actions helped to contribute approximately $264 million more revenues to highways than had been projected for that period. In addition, $194 million in freeway construction bonds were issued that had not been included in the Wilbur Smith revenue projections. Actual revenues from those sources and, including Highway Fund interest and bond issues from FY 1975 to FY 1981, reached the level projected by Wilbur Smith and Associates for the period FY 1975 to FY 1984. Additional revenues from motor carrier taxes were also provided for highways. We should have been ahead.

However, the maintenance and operations index increased from 100.0 in 1977 to 146.3 in 1981; the bid price index increased from 100.0 in 1977 to 156.7 in 1982. Our motor fuel receipts, on the other hand, declined from a high of $128.2 million in fiscal year 1979 to $116.4 million in fiscal year 1982, a decline of 9.2 percent. Vehicle registration fees, the other major state source of funding for our state system, rose from $63.3 million to $67.4 million, or 6.4 percent during the same period.

It now appears that the cost indices and our receipts are stabilizing, with minimal yearly changes. However, the rapid changes of the last five years have served to increase, rather than decrease, our total needs.

Structure of User Fees

While it appears clear that additional funding is necessary for interstate completion and preservation of the rest of the system, the best means of providing that revenue is not so easily determined.

It appears obvious that an increase in the revenues to the trust fund is necessary. Fuel tax increases are a means of accomplishing this. Other means and combinationsof means have been suggested in the final report on the federal highway cost allocation study. Kansas supports increased trust fund revenues: it takes no position regarding means.

User charges in Kansas are structured on two primary tiers, both of which account, at least theoretically, for differences in weight and use. The fuel tax has varying rates for liquefied petroleum, gasoline and diesel fuel; it is the component that levies charges based upon the amount of use. The second part of the Kansas structure, annual vehicle registration fees, are graduated from approximately $5 for motorized bicycles to $1475 for the 80,000 pound gross weight class.

The components of any user charge structure ought to contain two properties: First, the structure should consist of taxes or fees that are relatively simple to administer; second, the total structure should accomplish the principle of the structure, as determined by policy-makers, with a minimum of between class and within class inequity or subsidization. This second point may seem trivial, however, it is often in conflict with the first. For example, it has often been noted that a weight-distance type tax is indeed the most equitable means of imposing a user tax when that tax is desired by policy-makers. However, a weight-distance type tax flies in the face of the first principle, that of a simple tax to collect. A number of criteria do appear to be desirable, however:

(1) That the revenue base be responsive to inflation. That base might consist of taxes indexed to prices, or, might simply be a flat tax forecast to produce the revenue needed to carry out a program that includes inflation factors;

(2) That the revenue be provided by users.

As the Committee members are undoubtedly aware, the results of the new federal cost allocation study lie somewhere between the desires of the American Trucking Association and those of the American Association of Railroads. Indeed any state attempting its own cost allocation study is likely to find itself between similar competing groups. Kansas is about to embark on its own cost allocation study, and will carefully review all alternate methodologies. Kansas has no position at this point.

Kansas does feel that highway user taxes should go into the Highway Trust Fund, and that the Trust Fund be used only for highway funding. We find no real justification for the allocation of highway user revenues for non-highway purposes, in this instance, mass transit. If the logic for this is that mass transit can reduce the need for highway facilities and/or the preservation of them, then a similar case can be made for the use of highway trust fund monies for the support of air, rail, and water transportation.

By way of example, discussion has focused on whether the fifth cent of a 5¢ federal fuel tax increase should be devoted to mass transit. This indeed is a difficult question for Kansas. While it is clear that the transit authorities in our large metropolitan areas are in critical need of additional operating funds, it is the Kansas position that should the Federal government decide that highway user revenues are appropriate for mass transit, we suggest that the money be allocated to the states in accordance with highway fund category classes. It would be better to increase the urban and secondary apportionments by $1 billion and permit local units of government to use a percentage of these apportionments for mass transit. While this would violate the principle of highway funds for highway purposes only, it would enhance the principle of local determination. Alternatively, the state could be allowed to determine whether, and how much, should be dedicated to mass transit.

A similar issue was placed before the 1982 Kansas Legislature. Representatives of the Public Transit interests testified before a special committee on Transportation regarding public transportation financial needs, and asked for state funding if possible. The 1982 Legislature recognized that local units of government have needs in all areas of transportation, and relaxed the restrictions on current statutes, allowing those units to use up to 10% of the fuel tax distributions to those local units of government at the option of the several local governments.

Additional Issues

There are two other issues that are of interest to Kansas - exemptions and the diesel differential. I will address each in turn.

It appears that exemptions to certain components of the highway user charge structure, while serving to assist in the implementation of policy goals, also serve to increase the inequity in that structure. The gasohol exemption, for example, was certainly implemented for a laudable goal--decreased dependence on foreign oil while simultaneously maintaining our transportation structure. However, while that goal was to benefit all of society, not just highway users, non-gasohol using vehicles were forced to subsidize the gasohol using vehicles. A second example might be current exemptions for most government vehicles from fuel taxes, forcing highway users to pay a disproportionate share of general government costs.

Certain other exemptions do not appear inconsistent with the principles of cost allocation. The fuel tax exemption for off-road use, an exemption particularly pertinent to Kansas agriculture, is an example. The principle is obvious--off-road fuel users are not highway users, and the principle of equity is to allocate the cost among highway users, not fuel users. Some of the federal exemptions are of this type.

In the current Kansas structure, one particular exemption that is often the source of controversy is the differential registration fees for farm use trucks. A regular vehicle registration fee for a 24,000 lb. vehicle is $100, a farm tag for the same size vehicle is $42. One can argue that the farm vehicle will spend a substantial part of it's travel off-road. One could also argue that the importance of agriculture in Kansas justifies such an exemption. Regardless, the controversy still exists, and a cost allocation study is not about to solve it. Oregon, for example, has a long history of user charge structures based upon cost allocation and still maintains preferential treatment for lumber industry vehicles.

The diesel differential issue is of interest to us since we are one of the relatively few states that impose one. It should probably be established at the federal level if the federal user charge structure is not tied to a particular cost allocation structure. The reason is that for a given quantity of fuel, the more efficient diesel engine will produce more miles of travel than its gas burning counterpart. Therefore, the diesel burner pays less tax per mile when the tax is the same on both fuels. This argument is stated in the final report on the federal highway cost allocation study, and that the fuel economy differences between gasoline and diesel engines would call for the differential in tax rates to be about 30%. A possible problem with this argument, however, is, that by the same logic, radial tires would have to be taxed more since they produce a higher fuel efficiency. They enhance a lower cost per mile travel than their conventional counterparts.

Kansas, of course, has a fuel differential. Diesel fuel is taxed at 10¢ per gallon, gasoline at 8¢ per gallon, and liquefied petroleum at 7¢. However, the Kansas differential between gasoline and diesel may have been the result of a notion of cost responsibility rather than vehicle efficiency because the differential was instituted at the time Kansas abolished its ton-mile tax. In that case, the differential served to allocate charges to particular classes of vehicles. That is, they generally tended to be diesel burning vehicles, the heavier truck combinations.

TESTIMONY BY

A.G. LICHTENSTEIN

PRESIDENT, A.G. LICHTENSTEIN & ASSOCIATES, INC.

CONSULTING ENGINEERS

AND

CHAIRMAN OF THE ASCE SUBCOMMITTEE ON REHABILITATION OF EXISTING BRIDGES

BEFORE

THE SENATE SUBCOMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

August 18, 1982

BRIDGES, HIGHWAYS, RAILROADS
inspection
design
rehabilitation
historic restoration
HYDRAULIC STUDIES & DAMS

Abba G. Lichtenstein, P.E.
President

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Joseph J. Pullaro, P.E.
Charles M. Minervino, P.E.
David M. Moskowitz, P.E.
John W. Mallalieu

August 13, 1982

Honorable Steve Symms
Chairman
Transportation Subcommittee
United States Senate
Committee On Environment And Public Works
Dirksen Senate Office Building, Room 4200
Washington, D. C. 20510

Attn: Mr. Bob Stout and Ms. Jean Schrag

Dear Senator Symms:

Thank you for your kind invitation to appear before you and the other distinguished members of the Transportation Subcommittee as expressed in your letter dated August 2, 1982. I feel highly honored to testify and share my experiences with you on a very important subject of BRIDGES.

I come before you as a practicing self-employed Consulting Engineer who for the past twenty years concentrated his efforts and his work in the area of Highway and Railroad Bridges. I have selected for the purposes of this testimony to accentuate primarily the subject of Off-System Highway Bridges since I feel that State and Interstate highways and bridges have been brought to the Committee's attention by many other witnesses and experts.

My Consulting Engineering practice is conducted from three main offices; New York City, Fair Lawn, New Jersey and Langhorne, Pennsylvania. It encompasses the Inspection, Evaluation and Rehabilitation of all types of Bridges, from Ben Franklin Bridge in Philadelphia, the Tobin Memorial Bridge in Boston, to a Wooden Covered Bridge in Ripley, West Virginia. In preparing a booklet for George Washington University, where I teach a Continuing Education Course to Bridge Engineers, we note that our offices have been involved in approximately 3000 Bridges. Our clients are State and County and City Governmental Agencies, Toll Bridge Authorities, and in a lesser degree private institutions and people. An interesting part of our bridge practice covers the Evaluation and Restoration of Historic Bridges.

The main thrust of my testimony is directed towards REHABILITATION OF EXISTING BRIDGES. Our philosophy, based on our experiences, is that we must use our resources, upgrade our bridges, widen them or dualize them, where possible. In other words, before a bridge is totally replaced, it should be carefully studied, and determined that upgrading is not feasible. Federal Government, as represented by you Gentlemen, should encourage the recipients of Federal Aid for bridge improvements to reutilize and retrofit the existing bridges. There are many advantages. In most instances it is more economical to upgrade than replace. Permits for such work are obtainable much quicker, reducing inflationary costs of construction. Rehabilitation of bridges is much more acceptable to the public, and less opposition and discontent with elected officials and engineers. In some cases it also provides an opportunity to salvage important historic structures.

Three areas that require professional engineering scrutiny for the upgrading of a bridge are as follows:

1. Structural analysis.
2. Functional characteristics of the waterway or other clearances under the bridge.
3. Geometric configuration of the roadway width and clearances as related to safety standards.

Our experiences show that roughly 5 out of 10 inadequate bridges can be economically and practically upgraded with satisfactory results.

In order to achieve this goal of Bridge Rehabilitation, the bridge owners require the services of experienced Bridge Engineers, either on staff or by the engagement of outside Consultants. It is my opinion that the bridge owners should perform these tasks prior to or concurrent with their application for Federal assistance. Seed money expedites projects, clarifies the intent, and shortens public hearings and permit application. The Federal Government should encourage such financial activity by the applicants. Small Bridge Rehabilitation projects could be handled by the bridge owners through their maintenance forces or by contract, without Federal assistance. The larger and costlier assignments then should be applied for Federal Funding with the self-starters receiving preference.

I wish to add some personal comments on the various phases of Bridge Design and Construction, to optimize the benefits of the Federal Bucks:

1. DESIGN:

   I find that the State-of-the-Art of Bridge Design 50 or 60 years ago was adequate as to loading, factors of safety and selection of materials. The geometric design, however, was not as far-sighted and therefore we find a substantial number of functionally insufficient structures. AASHTO Specifications for Bridge Design are excellent, they are being continually updated through experience and research, and it is hoped that 50 years from now todays Bridges will be suitable for rehabilitation and upgrading. On that basis we would suggest that the live-load requirements for new structures should be HS 20 (36 Ton) plus 10%,as a minimum to reflect the tendency for larger and heavier trucks on our highways.

In recent years much attention is being paid by bridge engineers to the subject of fatigue of bridge members. The improvements in the detailing of bridges, particularly steel structures, will extend their useful life.

2. MAINTENANCE:

The maintenance of Bridges is an absolute must and should be programmed and adhered to carefully. There is no such thing as deferred maintenance. We believe the Federal Government should encourage the bridge owners to keep up their bridges in good condition,and in some way reward them,since this will save Federal Funds in the future for reduced costs of reconstruction of these well maintained structures.

3. CONSTRUCTION MATERIALS:

The three basic materials in bridge construction in the past have been timber, steel and concrete. While the basic materials are the same today, much improvement has been applied to these three elements. Laminated timber structures are used extensively in rural areas; our new steels are stronger and more durable; the introduction of prestressed concrete in various shapes and forms has created a new industry. It is the job of the bridge owners to select the proper materials in the upgrading and partial or total replacement of bridges.

4. CONSTRUCTION TECHNIQUES:

American techniques for the construction of bridges are well known. We all know the history of the Brooklyn Bridge. In our experiences we have seen many bridges, 80 or 90 years old, which had utilized ingenious methods and equipment in their construction. Todays cranes are larger, floating platforms are stronger, Bridge Contractors are more sophisticated, thus resulting in longer and more beautiful Bridges. I feel that the Federal Government should direct research monies into the area of improvement of material and construction techniques for bridges through our Universities, State Transportation Departments, and private practioners. One neglected area of research which is close to my heart is the need for a scientific program to establish the Range of the Useful Life Expectancy of Existing Structures. As Chairman of the Subcommittee on Rehabilitation of Existing Bridges for the ASCE, I have prepared a Research Program outline, a copy of which is attached herewith.

5. ENVIRONMENT:

Environmental issues are involved in every bridge rehabilitation or replacement project. Permits are needed. Time to obtain permits and approvals must be reduced, and procedures streamlined. We must be sure that the bridge improvement project does not cause damaging effects on the environment, but on the other hand,must we receive such blessings from local, State and Federal Agencies with the inherent duplication causing engineering delays and expenses and increased construction costs. We note that recently, some improvement had taken place in the permit and approval obtaining area. We compliment and support such efforts by these various Agencies in reducing the red-tape.

The subject of Historic Bridges has become very active all over the United States. We have noted a detailed awareness by the public of their historic properties, in particular Bridges. Rehabilitation is usually more acceptable. Details of railings, parapets, walls, have to blend with the historic ambience of the particular area. We suggest to you that the Federal Government encourage the various State and County Governments to pay attention to the Historic Bridges by the sponsorship of research into guidelines and specifications for the historic evaluation and restoration of Historic Bridges.

SUMMARY:

It is our testimony that the Federal Government must continue to assist financially the improvement of Bridges on all systems so that we do not have unsafe and obsolete structures. In the area of off-system bridges, we suggest the following avenues:

a) Take a close look at rehabilitation prior to replacement.

b) Provide encouragement for good and continuous maintenance.

c) Continue to support research into new and improved materials and construction techniques.

d) Encourage all agencies to streamline the approval and permit procedures.

e) Help define and issue guidelines for the determination of historic significance and restoration techniques of Historic Bridges.

f) Increase the amount of Federal Fundings for Bridge improvements.

We hope that our remarks presented above will be of assistance to you and your distinguished Committee in your deliberations on how to solve the present Bridge crisis. I for one, would be pleased to assist the Committee in any way that I can. Now I will answer any questions which may arise on this subject.

Very truly yours,

A. G. LICHTENSTEIN & ASSOCIATES, INC.

A. G. Lichtenstein, P.E.
President

AGL/eb
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DRAFT III

(ASCE COMM.)

REMAINING USEFUL LIFE OF BRIDGES

A. OBJECTIVE:

It is necessary to develop improved and practical techniques and methods to be able to estimate with confidence the REMAINING USEFUL LIFE OF EXISTING BRIDGES. This information for an existing Bridge could be expressed in the form of "YEARS REMAINING" or a RANGE of usefulness and would be beneficial for the following purposes:

1. When deciding whether a Bridge should be rehabilitated or replaced.
2. For establishing Insurance Premiums.
3. For inventory, maintenance and replacement programs.
4. Assessment and/or accounting calculations for taxing purposes.

B. DISCUSSION:

Many existing Highway and Railroad Bridges now in use were built at the turn of the Century. These Bridges were designed for light loadings, but still carry modern day vehicles and trains. The fact that these Old Bridges perform satisfactorily is in part due to the conservative design by our forefathers, their underestimation of the strength of the materials such as steel and concrete, and strengthening work that may have been added. These Bridges also suffer from many years of deferred maintenance, and their safety and performance are of major concern to the various Highway and Railroad Agencies which own and operate them.

The recently completed Program of INSPECTION AND INVENTORY of the Nation's Highway Bridges found many structures which are obsolete and unsafe by today's standards. Many Highway Bridges have been posted for reduced loadings. Similarly, Inspection of Railroad Bridges by the various Railroad and Transit Agencies have brought out the fact that many Old Structures in their respective systems are continually being overloaded. It has become important then to rate these Bridges for live load capacity, and just as essential to evaluate their Remaining Useful Life.

At present there are no scientific methods or formulae to establish the Remaining Useful Life of a Bridge or Range of Usefulness. The "Manual for Maintenance Inspection of Bridges 1978," (by AASHTO) provides the specifications for the inspection and rating of bridges. This Manual also requires that a Structural INVENTORY AND APPRAISAL SHEET be prepared for each Bridge inspected. Under Subheading Condition - (Item 63) Estimated Remaining Life, a Bridge evaluator is required to use his best judgement in completing the SIA Sheet. The instructions pertaining to the Item 63, Estimated Remaining Life, mention that this Estimate should be based on "All related and appropriate factors such as materials, traffic volume, age and other." State Highway Bridge Design Engineers, Bridge Maintenance Engineers, Consulting Engineers, have been attempting to comply with these sketchy instructions to their best ability wherein their personal education, experience and temperament usually provide the tools for making this important judgement. Without further assistance from the Bridge Engineering Profession, the normal reaction by the Bridge Rater would be to perform a superconservative evaluation of the Remaining Useful Life. This may result in a premature removal of a bridge and unjustified expense to the Bridge owners for a new bridge amounting to millions of dollars. We believe that a strong Research Program in that direction would provide the Bridge Engineer with a tool, chart or equation that would predict with reasonable accuracies the LIFE OR RANGE OF USEFULNESS of Highway and Railroad Bridges.

C. PROGRAM DESCRIPTION:

The remaining Useful Life of various types of Highway and Railroad Bridges results from a combination of many factors in the DESIGN DETAILS, MAINTENANCE, ENVIRONMENT, UTILIZATION AND INSPECTION. The following areas should be reviewed and researched:

* Compare various inspection reports for the same bridge at various time intervals.

* Evaluate the rate of deterioration.

* Establish loading patterns for the structure - How much overload? and frequency of loads and overload?

* Evaluate the influence of the environment. Air, Floods, Atmospheric and Chemical Corrosion.

* Evaluate the amount of maintenance and care:

    Records
    Repair of damaged members by impact
    Frequency of Inspection

* Study and define the various connections and details and their sensitivity to fatigue loadings. Such effects of changes and/or weight distribution of truck traffic can be calculated by formula, and should be further studied in relation to Remaining Life.

* Utilize rating calculations for the various members and their connections on the basis of dead and live load stresses.

* The geometry of the structure "as built" and "as is."

* Perform actual tests on various members and connections to determine the correlation between computed stresses and actual readings. Preference should be accorded to simple and inexpensive tests that are easily available.

* Establish the allowable strength of the various materials, which were used in the rating calculations, and compare with laboratory results for these materials.

- Try to arrive at a procedure and possibly a chart or formula which will establish the Useful Life or a Range of Usefulness for some Bridges based on certain conditions.

D. SUGGESTED PROGRAM:

It appears that the most effective method to research and prepare criteria for the establishment of the Useful Life or the Range of Usefulness of a Bridge is to assemble a Group composed of experts in the following fields:

a. Bridge Engineering.
b. Bridge Maintenance.
c. Statistics.
d. Strength of Materials.
e. Contractors experienced in construction and repair of Bridges.
f. Bridge owners or consulting engineers who are knowledgeable in the establishment of construction costs of new Bridges or repairs to old ones.

To find one organization with all this varied expertise and talent may be difficult. Therefore a combination of a University Civil Engineering Department, a Consulting Engineering Firm, Associations of Highway and Railroad Engineers and Construction personnel could be assembled and charged with the implementation of such a Program.

We understand that American Bridge maintains a technical laboratory researching Bridge matters, and the addition of such an element to the Group would be of great benefit. The cost of such a Program is difficult to assess at this time. It is suggested that the Program be divided into two steps:

1. Preliminary Investigation - Seed Money.
2. Complete Research Program with a resulting Publication of a Manual.

We believe an appropriation of $10,000.00 should be sufficient funds to provide an economical frame work and a selection of a Group of experts as indicated above. It should be the culminating duty of the Preliminary Investigation to establish the cost of the Complete Research Program.

E. SUMMARY:

Presently, Remaining Useful Life for Existing Bridges is being determined by Bridge Engineers utilizing basic engineering principles, experience, common sense - basically a "gut" feeling. It is imperative that more scientific and engineering methods be developed to estimate the Remaining Useful Life. A Research Program was suggested herein which would culminate in a chart or formula to arrive at a Range for the Useful Life of various types of Existing Highway and Railroad Bridges.

Analysis of the 1982 Federal Highway Cost Allocation Study

Testimony before the

United States Senate
Committee on Environment and Public Works
Subcommittee on Transportation

Honorable Steve Symms, Chairman

Presented by

Kenneth Heald, Highway Research Engineer
Western Highway Institute
San Bruno, California

August 18, 1982

Analysis of the 1982 Federal Highway Cost Allocation Study

Senator Symms, members of the Subcommittee, and staff persons--My name is Kenneth Heald. I am a highway research engineer and acting Chief Engineer of the Western Highway Institute. I thank you for the invitation to testify today on the Federal Highway Cost Allocation Study. Western Highway Institute has been studying highway cost allocation and other highway transport issues since 1947. Our research efforts have been focused on the Western United States and Canada, although WHI has also served as a federal subcontractor on several major vehicular research studies. WHI is supported by the dues of motor carriers, vehicle manufacturers and suppliers of services to the highway transport sector, but we serve only as a technical research group with neither a policymaking nor a lobbying role.

This Subcommittee is considering a complex subject which I see as encompassing four essential elements: vehicle size and weight, highway program funding levels, cost allocation, and tax recovery mechanisms. The federal studies and hearings can also be divided into those four separate but interacting parts. WHI has testified and contributed to the truck size and weight study and last year testified before this same Subcommittee on the highway program at the hearing in Boise, Idaho. Today I will speak only on highway cost allocation. However, WHI does request the opportunity to address tax recovery experience and mechanisms at one of the western field hearings.

My presentation will be:

- non-technical in nature, hopefully
- fully technically supportable
- based on findings from federal studies, AASHTO-sponsored research, or cooperative federal/state research projects rather than personal convictions.
- presented in the rather non-conventional format being demonstrated

Presentation Point 1:

The 1982 Federal Cost Allocation Study can be characterized as having:

- Accomplished some significant basic research and data base reconciliations.
- Explored in depth some economic concepts of cost occasioning and cost allocation which were commended for use but were found not readily applicable for practical application.

- Developed some novel techniques for redefining and assigning the costs occasioned by various classes of highway vehicles.
- Examined and quantified the fiscal impact of the broad spectrum of exemptions that currently grant immunity from various types of federal user taxes for selected highway vehicles.
- Developed and extensively exercised sophisticated procedures for "tailoring" cost recovery tax mechanisms to closely approximate any given set of cost responsibility determinations.
- Initiated some potentially significant pilot projects which could define a major new nationwide data collection effort associated with pavement life-cycle cause and effect relationships.
- Become a "directed" study as the result of the liberal interpretations given the legislative mandate for the work.
- Illustrated a very real communications problem between pragmatic highway engineers and idealistic economists as to the authoritative precision and utility of the AASHO Road Test relationships.

Presentation Point 2:

The provision and preservation of adequate pavement surfaces:

- Is a most critical element of our nation's total highway program.
- Comprises a major portion of the estimated (1980-1995) capital investments required for highways. (See Exhibit 1)
    - nearly 48% of the projected needs are associated with pavements.
    - all but 4% of the projected pavements expenditures involves reconstruction (43.6%).
- Is paramount among the controversial issues associated with the user group cost attribution methodology adopted.
- will be the focal point of my presentation today.

Presentation Point 3:

AASHO Road Test load-effect relationships:

- are widely utilized in pavement design.
    - provide the basis for the "AASHO Interim Guides for Design of Pavement Structures"
    - "Interim Guide" design procedures are used totally, in part or with modifications, by 34 of the 50 states (See Exhibit 2)

- are utilized in a wide variety of ways (See Exhibit 3)
    - 31 states use AASHO equivalency factors directly
    - 17 states do not use AASHO equivalency factors
    - 4 states use BPR modified factors in lieu of AASHO equivalency factors.
- are only one of the parameters considered in pavement design. (See Exhibit 3)
    - 10 areas of major consideration are illustrated
    - Little commonality or consensus exists as to how the various factors should interrelate or the degree to which they should interrelate.
- have provided useful tools for improvements in the art (empirical design procedures) of pavement design. (See Exhibit 4)
    - "Structural design of highway pavements has been an evolutionary process based primarily on the experience and judgement of highway engineers, augmented by empirical relationships developed by research and field studies."
    - "Although significant progress is being made toward more rational approaches ......, the alternate approach--emphasis on empirical techniques plus engineering experience and judgement--must continue to provide the basis for pavement design during the immediate future."

Presentation Point 4:

There is no broad-based experiential documentation which would correlate the service-life characteristics of pavements actually designed and built for mixed-traffic utility with that predicted by the AASHO Road Test "weight only" relationships.

- "The basic equations developed from the results of the AASHO Road Test were based on traffic that consisted of multiple applications of identical vehicle loads on each of the test loops. In order to be applicable to the design of pavement, these equations must be extended to use with mixed traffic; i.e., the random mixture of vehicles with different axle loads and number of axles that constitutes normal highway traffic." AASHTO Interim Guide For Design of Pavement Structures, 1972.
- "Using data from existing state pavement monitoring programs leads to many problems." (See Exhibit 5)
- "..... very limited pavement data have become available since the AASHTO (sic) road tests of the late 1950s and early 1960s."

- Typical problems that occur when trying to develop a common data base are as listed.

Presentation Point 5:

There is basis to dispute the contention that reconstruction should be evaluated differently than new construction.

- Overlay design practices lack any close correlation with projected strength (ESAL) requirements (See Exhibit 6)
  - "..... the few design methods available account for wheel load stresses only, with no consideration of stress resulting from volume changes."
  - "Such a procedure (rational procedure for designed rehabilitation) should incorporate some measure of the load carrying capacity of the existing pavements."
  - No widely accepted improvement in the theory of overlay design has occurred since 1965.
- The five types of construction operations considered in the 1965 federal study were (1) construction on new location, (2) reconstruction, (3) major widening, (4) minor widening, and (5) resurfacing. (See Exhibit 7)
  - differences among the first three types of work are of no significance to the incremental solution.
  - "Since increments of resurfacing thickness could not be computed by means of the road test equations, it was assumed that the incremental variation of resurfacing costs is the same as that of the bituminous surface used for new construction."
- the generalized serviceability curve (See Exhibit 8) suggests that the ultimate goal of both new construction and major maintenance (i.e., resurface/reconstruction) is to create the highest possible level of serviceability with some predetermined period of service life expectancy.
- While the procedures and costs associated with creating the highest possible level of serviceability may vary, there is no practical rational basis for a variation in the cost responsibility shares between new construction, reconstruction or resurfacing.

Presentation Point 6:

Differences in cost allocation methodology can and do produce extreme variations in user-group cost responsibility determinations:

- For new pavement cost assignments, the 1982 federal study shows relatively moderate variations between the "Recommended" Approach and the Incremental concepts. (See Exhibit 9)

  - "Recommended" Approach shifts a maximum of nearly 11 percent more overall responsibility from passenger vehicles to trucks.

  - Weight-Added 6-step Incremental is most nearly consistent with the real-world of engineering design and travel data reliability. It is also the procedure followed in the 1965 federal study.

  - Updating of the Incremental approach seeks to assign a larger share of "occasioned" costs as a function of increased vehiclular size and/or weight.

  - Increasing the number of increments considered automatically increases that portion of "occasioned" costs that are assigned relative to increased vehicular size and/or weight.

  - With even the most severe updating modifications (Updated 15-step Incremental), the differential shares of responsibility remain relatively constant throughout the entire spectrum of vehicles, regardless of the Incremental procedure utilized.

  - The "Recommended" approach for new pavement cost assignment nearly replicates the broad split between passenger vehicles and trucks, but drastically changes the intra-class shares as a direct result of its new philosophy.

- For rehabilitated pavement cost assignments, the newly-developed "Recommended" approach shows virtually no commonality in the "cost occasioned" shares allocated when compared to even the Updated 15-Step Incremental assignment. (See Exhibit 10)

  - The Recommended approach shows a nearly 30 percent shift in responsibility shares between passenger vehicles and trucks.

  - This results from taking the AASHO equivalencies out of the original design context.

  - The issue of environmental effects and their associated costs becomes inordinately significant but remains judgemental.

  - The imprecise order-of-magnitude ESAL (Equivalent Single Axle Load) values assume a critically determinant role in the new philosophy of cost responsibility assignment.

  - The non-linear physical relationships of the actual design process do not support the linear relationship assumed between cost and ESALs utilized in the Recommended approach. As stated in the 1982 FHCAS, "The proportional amount of pavement design cost attributable to any axle is simply in direct proportion to the average ESAL value of that axle."

- Though the new philosophy makes major changes in the responsibility shares, there is no broad-based data base which supports the validity of the concept. (See Exhibit 11)

Presentation Point 7:

There is no technically justifiable rationale for adopting a new untested philosophy rather than relying on an improved technically sound existing procedure.

- The Incremental approach is a "live" feasible alternative. (See Exhibit 12)
- Comparative cost responsibility determinations are given for both the "Recommended" and Incremental procedures.
- However, all user-charge taxation alternatives presented in the 1982 study are based solely and only on the "Recommended" approach.

Presentation Point 8:

Tax recovery mechanisms and tax rates based on the results of both the basic (6-Step Weight Added) and the modified (Updated 15-Step) Incremental procedures should be developed for the Subcommittee so that a more rational basis for equity in cost allocation can be explored.

- The 1982 Federal Highway Cost Allocation Study clearly shows that the Incremental process is a viable alternative. (See Exhibit 13)
- The Incremental concept was rejected strictly as the result of the new philosophical emphasis mandated by the CBO Guidelines.
- The quantitative significance of the changes in taxation shares resulting from the Recommended Approach are too drastic to be accepted without a more substantial basis in research validation.
- The federal experience gained in "tailoring" cost recovery mechanisms should make the rerun process of correlation with incrementally-determined cost responsibilities relatively straight forward and achievable.

Exhibit I

Extract From

Table IV-4
Estimated Capital Investment (1980-1995)
by Construction and Capacity/Noncapacity for Existing Facilities
(1979 Dollars)
(Millions of Dollars)

	Table Totals		Summation Totals[1]	
Construction Category	$	%	$	%
Pavements				
New rigid	3,496.1	1.73	3,496.1	4.02
New flexible	4,647.6	2.29	4,647.6	
Reconstruction rigid	9,937.2	4.90	9,937.2	43.55
Reconstruction Flexible	78,308.4	38.65	78,308.4	
Subtotal	(96,389.3)	(47.57)	(96,389.3	(47.57)
Bridges				
New (Non-Interstate)	1,789.0	8.8	1,789.0	5.39
New (Interstate)	- (?)	-	9,121.8	
Replaced	29,367.7(?)	14.5	17,367.4	8.57
Repaired	5,553.2	2.74	5,553.2	2.74
Unidentified	-	-	2,878.5(?)	1.42
Subtotal	(36,709.9)	(26.04)(?)	(36,709.9)	(18.12)
Other				
Right-of-way, new	3,663.4	1.81	3,663.4	1.81
Right-of-way, incidental	3,065.9	1.51	3,065.9	1.51
Grading, new	15,091.9	7.45	15,091.9	7.45
Grading, incidental	21,288.1	10.51	21,288.1	10.51
Administration, planning	2,569.5	1.27	2,569.5	1.27
Miscellaneous	23,832.1(?)	11.76	23,832.4	11.76
Subtotal	(69,510.9)	(34.31)	(69,511.2)	(34.31)
TOTAL	202,610.1	107.92(?)	202,610.4	100.00

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[1] Totals derived from the summation of the tabular detail vary from those indicated in the published document. Footnote explanations given are detailed but inadequate for reconciliation.

Exhibit 2

TABULATION OF STATE PAVEMENT DESIGN PROCEDURES

	FLEXIBLE PAVEMENT DESIGN PROCEDURE	RIGID PAVEMENT DESIGN PROCEDURE
Alabama	AASHTO	AASHTO
Alaska	CALTRANS	-
Arizona	AASHTO	AASHTO
Arkansas	AASHTO	AASHTO
California	CALTRANS	PCA (WM)
Colorado	AASHTO	PCA (WM)
Connecticut	(OWN)	(OWN)
Delaware	AASHTO	AASHTO
Dist. of Columbia	-	-
Florida	AASHTO	AASHTO AND PCA
Georgia	AASHTO	AASHTO
Hawaii	CALTRANS	PCA
Idaho	CALTRANS	PCA
Illinois	(OWN)	(OWN)
Indiana	AASHTO	AASHTO
Iowa	-	-
Kansas	(OWN)	(OWN)
Kentucky	(OWN)	AASHTO
Louisiana	AASHTO	AASHTO
Maine	AASHTO	-
Maryland	AASHTO	PCA
Massachusetts	AASHTO	PCA
Michigan	AASHTO	AASHTO
Minnesota	(OWN)	PCA (WM)
Mississippi	AASHTO	AASHTO
Missouri	(OWN)	(OWN)
Montana	AASHTO (WM)	PCA
Nebraska	AASHTO (WM)	AASHTO (WM)
Nevada	AASHTO	PCA (WM)
New Hampshire	AASHTO	-
New Jersey	AASHTO	AASHTO
New Mexido	AASHTO	AASHTO
New York	(OWN)	(OWN)
North Carolina	AASHTO	AASHTO
North Dakota	AASHTO	AASHTO
Ohio	AASHTO	AASHTO
Oklahoma	(OWN)	(OWN)
Oregon	CALTRANS	PCA (WM)
Pennsylvania	AASHTO	AASHTO
Rhode Island	AASHTO	-
South Carolina	AASHTO	AASHTO
South Dakota	-	-
Tennessee	AASHTO	AASHTO
Texas	(OWN)	AASHTO (WM)
Utah	AASHTO	AASHTO
Vermont	AASHTO	-
Virginia	(OWN)	AASHTO AND PCA
Washington	(OWN)	(OWN)
West Virginia	CALTRANS	PCA
Wisconsin	AASHTO	AASHTO
Wyoming	AASHTO	PCA

TABULATION OF THE NUMBER OF STATES USING EACH OF THE DIFFERENT FLEXIBLE PAVEMENT DESIGN PROCEDURES

FLEXIBLE PAVEMENT DESIGN PROCEDURE	NUMBER OF STATES
AASHTO	29
AASHTO (with modifications)	2
CALTRANS	6
OWN PROCEDURES[1]	11
NOT REPORTED	3

TABULATION OF THE NUMBER OF STATES USING EACH OF THE DIFFERENT RIGID PAVEMENT DESIGN PROCEDURES

RIGID PAVEMENT DESIGN PROCEDURE	NUMBER OF STATES
AASHTO	20
AASHTO (with modifications)	2
PCA	8
PCA (with modifications)	5
OWN PROCEDURES[1]	7
NOT REPORTED[2]	8

Source: Survey conducted in 1980 by AASHTO for the Truck Size and Weight Study

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[1] Most of the States which use their own procedures are essentially using one of the recognized procedures with slight modifications.

[2] Includes some States which build little or no rigid pavement.

Exhibit 3

Current State Highway Practice[a]

1. Use AASHO Interim Guide	
No direct use	16[b]
Used to modify design only	1
Used directly	32
Research in progress	3
2. Use AASHO Equivalency Factors	
Use directly	31
BPR modified factors	4
Do not use AASHO	17
3. Wheel Load Used for Design	
18-kip axle	38
5-kip wheel	8
Other	4
None	2
4. Methods for Subgrade Evaluation	
CBR	19
R value	10
Triaxial	5
Group Index	9
Other soil classifications	4
Pedologic classification	1
Frost index	1
Standard section	1
Experience	4
5. Use Regional Factor from AASHO Guide	
Used from guides	14
Used modified guides approach	18
Other sources	6
Regional factor not used	14
6. Factors Considered in Regional Factor	
Topography	5
Similarity to road test location	5
Rainfall	13
Frost penetration	5
Temperature	5
Ground water table	2
Subgrade type	4
Engineering judgment	13
Type of facility	3
Subsurface drainage	5
7. Consideration of Frost Penetration	
Regional factor	7
Use granular material	22
Not considered	12
Not a problem	11
8. Thickness of NFS Material	
Percentage of frost depth	11
Standard thickness	2
USACE procedure	4
Experience	7
9. Use AASHO Structural Layer Coeff.	
Use AASHO guide	8
Use modification to guide	20
Use guides (not for design)	6
Do not use	18
10. Vary Structural Coefficient with Pavement Position	
Vary struct. coeff.	13
Do not vary	30
Concept not used	9

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[a] Results summarized from NCHRP 128.

[b] Number of states (including D.C. and Puerto Rico).

Exhibit 4

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM
REPORT 128

EVALUATION OF AASHO INTERIM GUIDES FOR DESIGN OF PAVEMENT STRUCTURES

C. J. VAN TIL, B. F. McCULLOUGH, B. A. VALLERGA,
AND R. G. HICKS
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OAKLAND, CALIFORNIA

RESEARCH SPONSORED BY THE AMERICAN ASSOCIATION
OF STATE HIGHWAY OFFICIALS IN COOPERATION
WITH THE FEDERAL HIGHWAY ADMINISTRATION

FOREWORD

By Staff
Highway Research Board

Largely due to the complexity of the problem, the structural design of highway pavements has been an evolutionary process based primarily on the experience and judgment of highway engineers, augmented by empirical relationships developed by research and field studies. Performance of pavements nationwide over the past 50 years indicates that the subjective judgment of highway engineers has been rather successful. However, it is extremely difficult to translate the experience from a specific group of conditions to a design problem involving different conditions. Also, it is not known with any degree of certainty whether pavements that have performed satisfactorily were constructed as economically as possible.

Although significant progress is being made toward more rational approaches to the structural subsystem design of over-all pavement system management, the alternate approach—emphasis on empirical techniques plus engineering experience and judgment—must continue to provide the basis for pavement design during the immediate future. The relationships between traffic loadings and structural components of conventional pavements developed during the AASHO Road Test have provided useful tools for improvement of empirical design procedures.

Exhibit 5

Final Report on the Federal Highway Cost Allocation Study

Report of the Secretary of Transportation to the United States Congress

Pursuant to Section 506
Public Law 95-599

Surface Transportation
Assistance Act of 1978

U.S. Department
of Transportation
Federal Highway
Administration

PAVEMENT LONG-TERM MONITORING PROGRAM

Introduction

In response to the congressional mandate, a pilot study, the Pavement Long-Term Monitoring (LTM) Program, has been established to assess the problems in building a data base that can provide improved information on pavement performance relationships. If this pilot study shows promise, it will be placed on a firmer statistical basis and State participation will be broadened.

Using data from existing State pavement monitoring programs leads to many problems. Moreover, very limited pavement data have become available since the AASHTO road tests of the late 1950's and early 1960's. The typical problems that occur when trying to develop a common data base are:

- Historical data are frequently not available over a sufficient time period or have been collected sporadically.
- Significant data are often omitted.
- Apparently identical items of data are recorded in totally different units or have varying definitions.
- There is inadequate traffic or loading data.
- The pavement present serviceability index (PSI) has differing definitions.

Therefore, the FHWA, in cooperation with AASHTO and selected States, initiated the LTM program. It has been structured as a cooperative effort to demonstrate and share information on innovative pavement monitoring techniques and to establish a core number of case study sites (a minimum of ten sites per State) to be monitored over at least a ten year period.

Exhibit 6

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 128

EVALUATION OF AASHO INTERIM GUIDES FOR DESIGN OF PAVEMENT STRUCTURES

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RESEARCH SPONSORED BY THE AMERICAN ASSOCIATION
OF STATE HIGHWAY OFFICIALS IN COOPERATION
WITH THE FEDERAL HIGHWAY ADMINISTRATION

CHAPTER FOUR

CONCLUSIONS AND SUGGESTED RESEARCH

CONCLUSIONS

On the basis of the findings of this investigation, the following major conclusions are drawn:

1. The Interim Guides were established on the basis of findings for one of a myriad of possible environmental, material, and construction conditions. Engineering judgment, together with some theoretical considerations, were used to extrapolate the results to other conditions. Unfortunately, the relative effect of each of the variables affecting the pavement design has too often been overlooked.

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7. The review of current overlay design practices indicates that the few design methods available account for wheel load stresses only, with no consideration of stresses resulting from volume changes. Of the procedures available, only those using deflection measurements evaluate the load-carrying capacity of the in-place pavement.

The flexible pavement design portion of the Interim Guides has been used in the design of overlays, but such an application is an extension of the empirical relationships beyond their limits. This is especially true with regard to its use with rigid pavements, because there is no basis in AASHO Road Test results for the assignment of structural layer coefficients to portland cement concrete. Therefore, a more rational overlay design procedure is needed in order to account for both wheel load and volume change stresses.

RECOMMENDED FUTURE RESEARCH

It is strongly recommended that research be continued along the lines explored in this project. Specifically, additional research is needed in the following areas:

1. Development of improved traffic projection methods to consider changes in both traffic volume and axle loads distribution. This is particularly important when looking ahead to potential increases in maximum allowable axle loadings.

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5. Development of a more rational procedure for designed rehabilitation of existing pavements. Such a procedure should incorporate some measure of the load-carrying capacity of the existing pavement, and should be applicable to determining overlay requirements for both flexible and rigid pavements.

Exhibit 7

SUPPLEMENTARY REPORT
OF THE
HIGHWAY COST ALLOCATION STUDY

Prepared pursuant to section 210 of
the Highway Revenue Act of 1956

by the

U.S. DEPARTMENT OF COMMERCE
Bureau of Public Roads

February 1965

Construction operations.—Through-traffic road expenditures were grouped into five types of construction operation, namely: (1) Construction on new location; (2) reconstruction; (3) major widening (added lanes); (4) minor widening (added lane width); and (5) resurfacing. Differences among the first three types of work are of significance to the differential benefit study but not to the incremental solution. Each of these three operations involves the construction of all pavement components to a width of two or more lanes. For any given environment and volume and composition of traffic the pavement design and the incremental variation of pavement cost with axle load are the same for all three types of new pavement construction.

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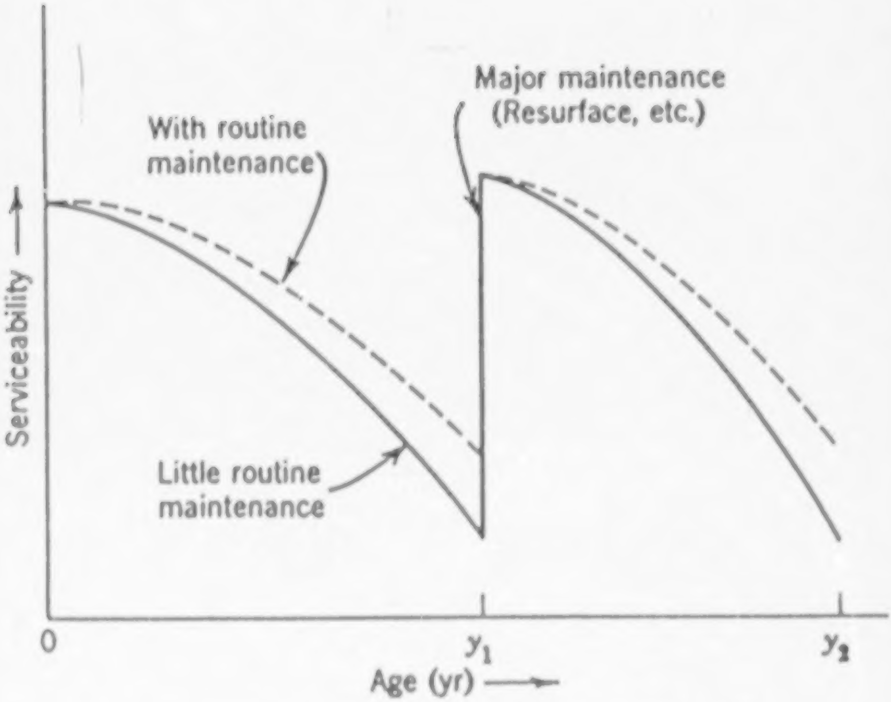
The AASHO road test staff made a study of the effectiveness of asphaltic concrete overlays on 99 flexible pavement sections and 18 rigid pavement sections, but as reported on pages 112–115 and 203–204 of Highway Research Board Special Report 61E (2), attempts at mathematical analysis designed to establish specific relationships between performance and overlay design were not successful. Since increments of resurfacing thickness could not be computed by means of the road test equations it was assumed that the incremental variation of resurfacing costs is the same as that of the bituminous surface used for new construction.

Exhibit 8



Generalized serviceability versus age.

Exhibit 9

Table D-2

Comparison of New Pavement Cost Assignments

(1985: Percentage of Costs Assigned to Each Vehicle Class)

Vehicle Class:	Min. Thickness (Recommended) Approach	Updated 15-Step Incremental	Updated 6-Step Incremental	Weight-Added 6-step Incremental
Passenger Vehicles	47.51	53.68	56.56	58.29
Autos	33.60	34.08	36.67	38.47
Large	20.18	20.11	20.14	20.95
Small	13.42	13.98	16.53	17.52
Motorcycles	0.36	0.09	0.15	0.16
Pick-ups and Vans	12.48	18.34	18.70	18.67
Buses	1.06	1.16	1.05	0.99
Intercity	0.18	0.19	0.17	0.16
Other	0.88	0.97	0.88	0.83
Trucks	52.49	46.32	43.44	41.71
Single Unit	5.91	8.11	7.88	7.49
Under 26 Kips	2.91	4.63	4.60	4.38
Over 26 Kips	3.00	3.49	3.28	3.11
Combinations	46.56	38.21	35.55	34.22
Under 50 Kips	3.54	4.36	4.07	3.91
50 - 70 Kips	7.03	7.97	7.44	7.13
70 - 75 Kips	13.86	11.39	10.55	10.18
Over 75 Kips	22.15	14.49	13.50	13.00
All Vehicles	100.00	100.00	100.00	100.00

Exhibit 10

Table D-4

Comparison of Rehabilitated Pavement Assignment Methods

(1985: Percentage of Costs Assigned to Each Vehicle Class)

Vehicle Class:	3 Newly-Developed Relationships (Recommended)	1 Road Test Equations for 100% of Costs	2 Road Test Equations for 70% of costs	Updated (15-Step) Incremental
Passenger Vehicles	→ 30.29	7.66	31.21	59.75 ←
Autos	15.40	0.84	17.47	29.22
Large	10.16	0.79	10.69	19.05
Small	5.23	0.05	6.78	10.17
Motorcycles	0.11	0.00	0.23	0.12
Pick-ups and Vans	12.51	2.89	10.58	28.87
Buses	2.27	3.92	2.93	1.54
Intercity	0.45	0.79	0.59	0.32
Other	1.82	3.13	2.34	1.22
Trucks	→ 69.71	92.34	68.79	40.25 ←
Single Unit	11.88	15.78	12.79	11.53
Under 26 Kips	4.14	4.89	4.52	6.71
Over 26 Kips	7.73	10.89	8.27	4.83
Combinations	57.84	76.56	56.00	28.72
Under 50 Kips	4.35	5.68	4.31	3.46
50 - 70 Kips	8.29	11.48	8.51	5.45
70 - 75 Kips	15.78	20.88	15.30	8.64
Over 75 Kips	→ 29.42	38.53	27.88	11.17 ←
All Vehicles	100.00	100.00	100.00	100.00

Exhibit 11

Final Report on the Federal Highway Cost Allocation Study

Report of the Secretary of
Transportation to the
United States Congress

Pursuant to Section 506
Public Law 95-599

Surface Transportation
Assistance Act of 1978

US Department
of Transportation

Federal Highway
Administration

"Despite the many highway pavements built during the past 20 years, there are simply not enough monitored sections with adequate traffic data to conclusively verify the mechanistic pavement behavior theory that was relied upon in the development of the pavement distress models used in this cost allocation study."[1]

---

[1] Final Report on the Federal Highway Cost Allocation Study, U.S. Department of Transportation, May, 1982, pp. IV-45 & IV-46.

Exhibit 12

Final Report on the Federal Highway Cost Allocation Study

Report of the Secretary of
Transportation to the
United States Congress

Pursuant to Section 506
Public Law 95-599

Surface Transportation
Assistance Act of 1978

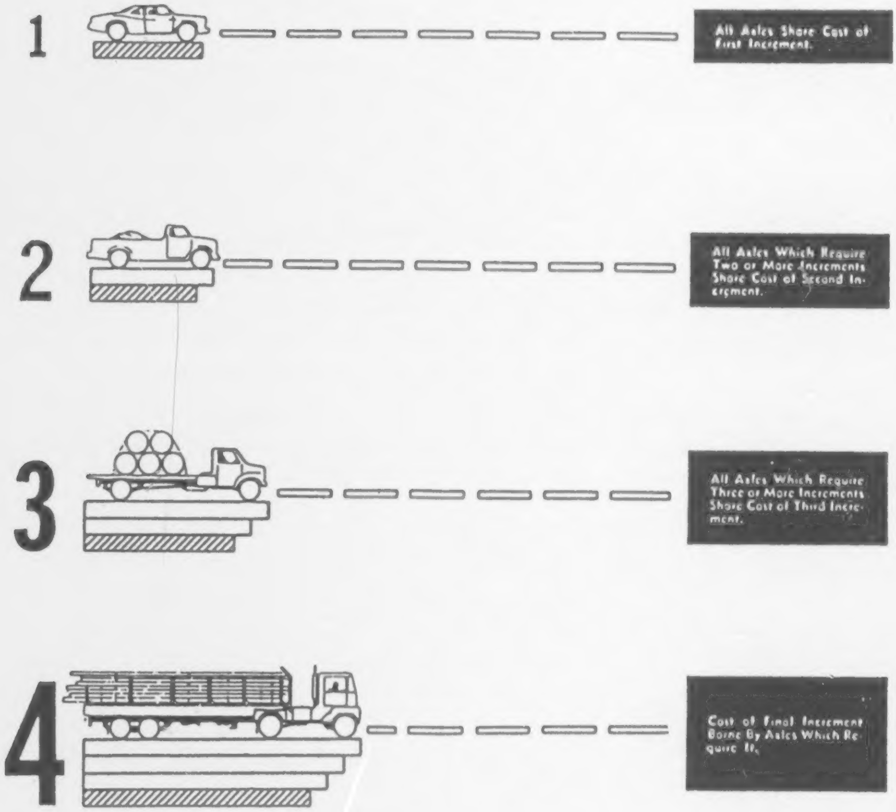
U.S. Department
of Transportation
Federal Highway
Administration

COST ASSIGNMENTS

Cost assignments are reported and compared first for the two principal and feasible allocation approaches, 1) the recommended and 2) updated incremental approaches. Results for each of these is reported for both the base and forecast periods but far more detail is reported for the forecast period than the base period and for the recommended approach than the updated incremental approach. This is because user charge alternatives are based on forecast period cost assignments from the recommended approach.

Exhibit 13

1982 Federal Study shows that the Incremental Concept of pavement cost allocation is still a "live" procedural alternative


1
All Axles Share Cost of First Increment.
2
All Axles Which Require Two or More Increments Share Cost of Second Increment.
3
All Axles Which Require Three or More Increments Share Cost of Third Increment.
4
Cost of Final Increment Borne By Axles Which Require It.

WHI RESPONSE

TO

QUESTIONS POSED

BY

THE HONORABLE STEVEN D. SYMMS
CHAIRMAN, SUBCOMMITTEE ON TRANSPORTATION
UNITED STATES SENATE COMMITTEE
ON
ENVIRONMENT AND PUBLIC WORKS

OCTOBER, 1982

WESTERN HIGHWAY INSTITUTE
SAN BRUNO, CALIFORNIA

WHI
WESTERN HIGHWAY INSTITUTE
1200 Bayhill Drive
San Bruno, California 94066
(415) 952-4900

October 15, 1982

The Honorable Steven D. Symms, Chairman
Subcommittee on Transportation
U.S. Senate Committee on Environmental
and Public Works
Washington, D. C. 20510

Dear Senator Symms:

As a follow-up to our written and oral testimony presented at the hearings on highway program needs, revenues, and cost allocation held in Washington, D. C., on August 18, 1982, we are pleased to be asked to address the rather substantial list of questions forwarded for written response.

We are aware that this is a general list of questions submitted to several trucking-related organizations. It may be appropriate then to reemphasize that WHI is a technical organization with research responsibilities primarily in the western U. S. and Canada. As such, WHI takes no policy position on specific legislative proposals and has no advocacy function. Consequently, these responses are framed from our research experience and do not necessarily reflect the policy positions of any trucking industry group.

Enclosed herewith is a copy of the WHI technical staff response to the questions posed. We would be pleased to discuss any of the material in further depth with either you or your staff.

Sincerely,

Kenneth L Heald

Kenneth L. Heald
Chief Engineer

KLH/lb

Enclosure

LETTER OF REQUEST

ROBERT T. STAFFORD, VT., CHAIRMAN
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BAILEY GUARD, STAFF DIRECTOR
JOHN W. YAGO, JR., MINORITY STAFF DIRECTOR

United States Senate
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
WASHINGTON, D.C. 20510

September 16, 1982

1/ Dr. Keith Heald
Highway Research Engineer
Western Highway Institute
1200 Bayhill Drive
San Bruno, CA 94066

Dear Dr. Heald:

I want to thank you for testifying before the Subcommittee on Transportation during the recent hearings on highway program needs, revenues, and cost allocation issues. We did not have sufficient time during the hearing to discuss all the issues and questions of concern to the various subcommittee members, and because of that I would appreciate receiving your written response to the enclosed questions.

In order for your response to be included in the hearing record, I ask that it be submitted no later than October 18, 1982.

Thank you for your assistance.

Sincerely,

Steve Symms

Steve D. Symms
Chairman
Subcommittee on Transportation

SDS:nh

1/ Alias: Mr. Kenneth Heald as correctly identified on the Subcommittee Witness List

FOLLOW-UP QUESTIONS FOR THE WESTERN HIGHWAY INSTITUTE

1. The American Trucking Associations recently commissioned two studies of pavement deterioration. Both these studies assert that environment, not use, is the major cause of pavement deterioration. The American Association of State Highway and Transportation Officials reviewed the studies and found that: (1) they appear to ignore the many studies that did show a strong correlation between axle applications and pavement deterioration; and (2) they fail to point out that loads and environmental factors interact, one reinforcing the other, to cause pavement damage. Don't these two points indicate that some damage-related approach, rather than the incremental approach, is required to allocate pavement rehabilitation costs?

2. In its review of the two above studies, AASHTO states that "it is the opinion of the AASHTO that the conclusions of the two consulting reports are not valid." You have been critical of the CBO and DOT cost assignment methods. How do you respond to the AASHTO criticism of the ATA-sponsored studies?

3. The 1962 AASHO Road Test found that a fully loaded tractor-trailer/semi combination does the same amount of pavement damage as it takes 9,600 cars to cause. The recent DOT cost allocation study uses a ratio of approximately 1 to 18. Do you believe this is a conservative estimate?

4. Since AASHO load effect relationships are widely used in pavement design and form the basis of the "AASHTO Interim Guides for the Design of Pavement Structures", why do you call their use in the DOT study a "new, untested philosophy"?

5. In testimony last month, CBO stated that the DOT study "represents a significant improvement over previous studies of this sort, chiefly because it has replaced the incremental method of cost allocation with a consumption-based method." Why do you favor use of the incremental method, which both CBO and DOT reject?

6. CBO commented further on the incremental method, saying:

> The situation is analogous to a 1-cent sale on aspirin in which after paying the full price for the first bottle, a second may be purchased for only 1 cent more. Rather than allocating costs based on the number of 'aspirin' each user consumes, the incremental approach effectively assigns the costs of the first, full-price bottle to cars and that of the second, reduced-price bottle to trucks. While the distortion caused by the incremental method is not as large as this, trucks nonetheless receive preferential treatment under this approach.

Please comment on the CBO analogy.

7. Is there anything about the incremental approach, besides the fact that it has been used before, that makes it preferable to the approach advocated by DOT? How is the incremental approach technically sound for allocating pavement 4-R costs?

8. In addition to the U.S. DOT, a number of States and foreign countries have, over the last several years, used the consumption approach to pavement damage. Why do you believe they have done so, and why do you call the consumption approach a "new, untested philosophy"?

9. Do you believe that the incremental method as used in the Federal study submitted to Congress in the 1960's adequately treated pavement rehabilitation costs? Is it based on how pavement 3-R costs are occasioned?

10. Both DOT's recommended cost allocation approach as well as the incremental method show that the lighter trucks have been subsidizing heavy combination trucks. Do you believe there should be a redistribution of tax responsibility among truck classes or should this subsidization continue?

11. Mr. Kiley stated at the August 10, 1982 hearing that DOT had "queer figures" on light trucks and that the Federal data are questionable. How would you differ with the procedures used by DOT to estimate truck population?

12. Cars are becoming smaller and lighter while trucks become larger and heavier. Also, the percentage of cars in the vehicle traffic stream is declining while the percentage of combination trucks increases. Why then shouldn't the heavier vehicles assume a larger share of Federal road-use taxes?

13. Most of the objections to the Federal cost allocation study heard in our recent hearings have come from the trucking industry. To your knowledge, are there other major groups critical of the study?

14. Highway engineers and pavement experts often point to the interactive effect between loads and environmental factors. Has this interactive effect been analyzed by the trucking industry?

15. Does DOT's use of vehicle miles of travel rather than axle miles to allocate basic pavement thickness result in a lower or higher cost assignment to heavy vehicles?

16. Would heavy trucks be assigned a greater cost if bridge repair costs were treated as residual rather than directly attributable costs? Does the new DOT study assign more bridge repair costs to heavy vehicles than the 1965 DOT study?

17. As a part of the Section 506 study the Federal Highway Administration established a pavement long-term monitoring process. Do you agree with FHWA's approach on LTM?

18. Do you believe all trucks should pay the same rate of excise taxes regardless of how many miles they are driven per year, or should miles driven be reflected in all the tax rates rather than just in the fuel taxes?

19. Several States have a weight-distance tax and maintain that they are able to administer and enforce it successfully. Proponents say the tax is a good way to track the damage responsibility of heavy trucks. In the interest of equity, shouldn't a Federal weight-distance tax be considered, along with an increase in the fuel tax?

20. Some of the States presently impose a differential gasoline and diesel fuel tax. The DOT study suggests that consideration be given to such a fuel differential at the Federal level. Since diesel powered vehicles have greater fuel efficiency and do not contribute as much revenue per mile of travel as gasoline powered vehicles, why wouldn't this be a fairer way to tax?

21. DOT has suggested that the present annual heavy vehicle use tax be graduated as a function of weight rather than remaining constant across all weights and in addition that the tax be assessed directly on vehicles' registered gross weight. Wouldn't these changes more fairly assign cost responsibility?

22. What percentage of the truck use tax would you estimate is not being collected at present? How could administration and compliance be improved?

23. What is your view of the States participating in the collection of the truck use tax?

24. What are your views on the current taxes on tires, tubes, and tread rubber? Should any of these taxes be eliminated or modified?

25. Similarly, what changes, if any, would you suggest in the current taxes on new trucks, truck parts and accessories?

26. Several States have implemented an indexed fuel tax. What is your opinion on indexing?

27. What effect would increasing only the Federal gas tax have on the equitable distribution of costs among the user classes?

28. Because of the cyclical nature of the trucking business, would not your industry be better off with a per-mile user fee rather than a lump-sum fee?

29. CBO testified that under staff alternatives 1 and 3, "the likely impact on truck operations should be quite modest. Total trucking costs, including the costs of the driver and distribution costs, are likely to rise by between 1.4 and 1.8 percent." What are your estimates?

30. In the competition for freight traffic, the railroads' share has been declining while trucks' share has steadily climbed. How much of the freight business is rail-truck competitive and what economic impact do you foresee if taxes on the heaviest trucks are raised?

31. The railroads argue that they should carry loads of 50,000 pounds or more while the trucking industry continues to seek an increase in the Federal weight limit of 80,000 pounds. Isn't there some point at which truck weight becomes too heavy and hence a major factor in highway deterioration?

32. In the General Accounting Office's 1979 study Excessive Truck Weight: An Expensive Burden We Can No Longer Afford there was an estimate that trucks run overweight more than 20 percent of the time. What are your most recent estimates?

33. The truck size and weight issue is before a number of State legislatures as well as Congress. What do you see as the major considerations in any proposal to raise size and weight limits?

34. The Oregon DOT has stated, "(w)e have also observed that longitudinal cracking in pavements can either be environmentally or load caused... However, without heavy wheel loads, these cracks require little or no maintenance in Oregon's climate." What is your reaction to this statement?

35. Both the Arkansas and Louisiana DOT's have asked trucks to use the left lanes on certain Interstate highways. Why do you believe this request was made?

36. There has been frequent reference to the Baltimore-Washington Parkway as an example of a highway that is deteriorating despite the absence of truck traffic. AASHTO testified last month that a highway's service life is finite. Since the B-W Parkway is 22 years old, can't it be argued that it has, in fact, lasted its intended service life?

37. It has been said that toll roads could better match rates to actual road costs. What is your position on toll financing of highways?

38. At what point does the road damage and deterioration become so severe as to constitute a major, national problem? How large-scale are the highway infrastructure needs at present?

SPECIFIC RESPONSE TO QUESTIONS

Question 1

The American Trucking Associations recently commissioned two studies of pavement deterioration. Both these studies assert that environment, not use, is the major cause of pavement deterioration. The American Association of State Highway and Transportation Officials reviewed the studies and found that: (1) they appear to ignore the many studies that did show a strong correlation between axle applications and pavement deterioration; and (2) they fail to point out that loads and environmental factors interact, one reinforcing the other, to cause pavement damage. Don't these two points indicate that some damage-related approach, rather than the incremental approach, is required to allocate pavement rehabilitation costs?

Given the opportunity, WHI would be pleased to review the rationale for the AASHTO findings cited; however, it is difficult to understand how it could be said that the ATA-sponsored studies failed to consider the interaction between loads and environment in pavement deterioration. The Texas Transportation Institute study, in particular, had a completely separate classification of pavement distress for "load and environment combined" which was carried through the entire analysis. In any case, the existence or non-existence of such an interaction has nothing in particular to do with the nature of the approach which should be used to allocate responsibility for pavement cost.

The AASHO Road Test was specifically designed to examine and quantify traffic load-effect relationships as the basis for improving highway pavement design theory. As subsequently developed, the "damage" function relationships have been integrated into the overall pavement design process in a majority of the states and should therefore have improved the reliability of the engineering estimates of service-life expectation and performance. While the design concepts for pavement rehabilitation procedures tend to be more empirical and less closely tied to the AASHO Road Test relationships, the common goal of all new construction, resurfacing, and reconstruction is to create or recreate the highest possible level of serviceability for some predetermined period of surface life expectancy.

The Incremental approach to the allocation of pavement surface costs is based on this design theory which directly incorporates the damage-function relationships in their properly intended role. We submit, therefore, that the Incremental approach is not only a damage-related approach, but that it also recognizes and properly accounts for other areas of potential weakness such as characteristics of materials, inappropriate construction practices, environmental anomalies, and even deferred maintenance. No other damage-related approach can make these claims.

Question 2

In its review of the two above studies, AASHTO states that "it is the opinion of the AASHTO that the conclusions of the two consulting reports are not valid." You have been critical of the CBO and DOT cost assignment methods. How do you respond to the AASHTO criticism of the ATA-sponsored studies?

Again, WHI has not been provided a copy of the AASHTO statement and therefore cannot respond to it directly. However, it should be noted that the AASHO Road Tests were never represented as, nor have they proved to be, the last word in the search for a better, more complete understanding of the interactions associated with the multiplicity of factors which influence pavement serviceability and structural deterioration over time given mixed-traffic loading and environmental conditions.

During the 20 plus years since the completion of the AASHO Road Tests, the number of state and federally-sponsored research studies dealing with pavement design and performance are legion, but there is yet to be completed any broad-based analytical study which has won the total endorsement and acceptance of the entire highway fraternity. Even so, any statement which blatently claims that "the conclusions of the two consulting reports are not valid" must either have been taken out of context or issued in the absence of a thorough technical review. It is inconceivable that any two technical studies, irrespective of source, could be seen as contributing so little to the reservoir of current understanding in any field of study.

The CBO/DOT cost assignment methods acknowledge but ignore the fact that pavement consumption functions have not been adequately calibrated or correlated with enough real-life experience to even attempt to address the questions of general applicability which are being raised. The Federal Highway Cost Allocation Study (FHCAS) admits this deficiency in noting that "..... very limited pavement data have been available since the AASHTO (sic) road tests of the late 1950's and early 1960's" and is even more explicit concerning this deficiency in the following statement:

> "Despite the many highway pavements built during the past 20 years, there are simply not enough monitored sections with adequate traffic data to conclusively verify the mechanistic pavement behavior theory that was relied upon in the development of the pavement distress models used in this cost allocation study."

Question 3

The 1962 AASHO Road Test found that a fully-loaded tractor-trailer/semi combination does the same amount of pavement damage as it takes 9,600 cars to cause. The recent DOT cost allocation study uses a ratio of approximately 1 to 18. Do you believe this is a conservative estimate?

The first oft-repeated claim can be restated to say, "The relatively low axle weights of cars have little if any relevance in the determination of the pavement strength requirements for mixed traffic highways." Note that neither choice of presentation says anything about actual pavement strength requirements nor the associated costs; and, therefore, neither have any specific significance except in their proper context as pavement design input parameters.

At the other end of the spectrum, the 1 to 18 DOT ratio cited, though undocumented, appears to be nothing more than a conclusionary statement emanating from an investigative procedure which is embroiled in controversy. Based on data from FHCAS Tables D-3 and D-4 and given the estimates of taxable fleet size, the DOT final assessment ratios can be shown to calculate as 1 to 18 for new pavements but 1 to 87 for rehabilitated pavements, a substantial difference.

Since the two subject statements presented for comparison are interconnected only by the intervening $7 million FHCAS study, any joint consideration of the two sheds absolutely no light on the authority of the DOT findings. Further, since DOT chose not to fully detail the results of any methodology other than their own, DOT has presented no parallel analysis by which to evaluate their findings.

Question 4

Since AASHO load effect relationships are widely used in pavement design and form the basis of the "AASHTO Interim Guides for the Design of Pavement Structures," why do you call their use in the DOT study a "new, untested philosophy"?

Included in the WHI written testimony as submitted is a reference to a statement made by the staff of the Highway Research Board. The statement appeared in the "Foreword" of National Cooperative Highway Research Program Report 128 - Evaluation of AASHO Interim Guides for Design of Pavement Structures and reads (with emphasis added by WHI) as follows:

> "Largely due to the complexity of the problem, the structural design of highway pavements has been an evolutionary process based primarily on the experience and judgment of highway engineers, augmented by empirical relationships developed by research and field studies. Performance of pavements nationwide over the past 50 years indicates that the subjective judgment of highway engineers has been rather successful. However, it is extremely difficult to translate the experience from a specific group of conditions to a design problem involving different conditions. Also, it is not known with any degree of certainty whether pavements that have performed satisfactorily were constructed as economically as possible.
>
> "Although significant progress is being made toward more rational approaches to the structural subsystem design of overall pavement system management, the alternate approach--emphasis on empirical techniques plus engineering experience and judgment--must continue to provide the basis for pavement design during the immediate future. The relationships between traffic loadings and structural components of conventional pavements developed during the AASHO Road Test have provided useful tools for improvement of empirical design procedures."

There can be little doubt that the AASHO load effect relationships have contributed significantly to an overall improvement in the engineer's capability to better match pavement design and the mixed traffic loadings expected. However, the basic design procedures are sensitive only to order-of-magnitude equivalent single axle load (ESAL) values, and the physical relationship of the actual designs have no simple linear relationships which correlate ESAL requirements and cost. Further, the damage functions of the AASHO Road Test have not been validated in any broad-based analytical study of real-world, mixed traffic facilities given normal routine maintenance care.

At such time as the load-effect relationships can be fully verified, the net result would still be only to provide a more nearly correct method for the consideration of the axle weight parameter in the overall design process--whether for new construction, for reconstruction, or for major resurfacing. Pavement cost attribution to vehicle classes should still be based on the actual requirements for providing real-world equal service-life facilities for each vehicular group.

DOT's new, untested philosophy rests heavily on recently developed statistical relationships which have not been validated by real-world experience. Further, the methodology has no correlation whatsoever with the physical laws which define the pavement strength requirements necessary to provide facilities for successively heavier increments of vehicular weight.

Question 5

In testimony last month, CBO stated that the DOT study "represents a significant improvement over previous studies of this sort, chiefly because it has replaced the incremental method of cost allocation with a consumption-based method." Why do you favor use of the incremental method, which both CB^ and DOT reject?

The CBO position appears to stem primarily from the perspective of economics that says that if one can precisely define the specific cause and effect relationship of any project--then one should be able to precisely define the elements of costs associated with any additional increment of investment. CBO was apparently bothered by the fact that a significant portion of most roadway facility costs have typically been considered common costs; i.e., costs that cannot be assigned to a specific variance in vehicular size and/or weight. In their search for some more precisely definitive relationships, the equivalency factors derived from the AASHO Road Test project and the associated, so-called "damage" functions have been taken out of the design context for which they were developed and assigned a critically determinant role in a new philosocphy of cost responsibility assignments.

Unfortunately CBO seemingly overlooked the fact that the engineering fraternity, while accepting the AASHO work as a tool for the improvement of empirically-developed pavement design procedures, has never fully embraced nor extended the body of research that would be required to more thoroughly understand, quantify, and apply a "pavement consumption" philosophy. In fact, some of those engineers most closely allied with the conduct of the AASHO Road Test work were instrumental in the development of the Incremental Concept as the mechanism they judged to be most appropriate for interrelating the AASHO results with cost responsibility determinations.

CBO was also critical of the original Incremental process since the AASHO Road Test relationships were not utilized in the handling of the cost attribution for resurfacing and reconstruction. While this was not a subject of such great urgency and concern at that time, the BPR engineers stated their position as follows:

> "Since increments of resurfacing thickness could not be computed by means of the road test equations, it was assumed that the incremental variation of resurfacing costs is the same as that of the bituminous surface used for new construction."

All things considered, there would seem to be no basis for the CBO/DOT contention that pavement reconstruction should be evaluated differently than new construction. As stated before, the ultimate goal of both new construction and major maintenance (i.e., resurface/reconstruction) is to create the highest possible level of serviceability with some predetermined period of service life expectancy. While the procedures and costs associated with creating the highest possible level of serviceability may vary, there is no practical rational basis for a variation in the methodology for cost responsibility determination between new construction, reconstruction, or resurfacing given any set of pavement design circumstances.

Question 5 (response continued)

The FHCAS effectively demonstrates that the Incremental approach is a "live" viable alternate. As stated (with WHI emphasis added):

> "Cost assignments are reported and compared first for the two principal and feasible allocation approaches, (1) the recommended and (2) updated incremental approaches. Results for each of these is reported for both the base and forecast periods but far more detail is reported for the forecast period than the base period and for the recommended approach than the updated incremental approach. This is because user charge alternatives are based on forecast period cost assignments from the recommended approach."

The FHCAS goes on to demonstrate that differences in cost allocation methodology can and do produce extreme variations in user-group cost responsibility determinations. It is our position that there is no technically justifiable rationale for adopting a new untested philosophy rather than relying on an improved, technically-sound existing procedure.

Question 6

CBO commented further on the incremental method, saying:

> *The situation is analogous to a 1-cent sale on aspirin in which after paying the full price for the first bottle, a second may be purchased for only 1 cent more. Rather than allocating costs based on the number of "aspirin" each user consumes, the incremental approach effectively assigns the costs of the first, full- price bottle to cars and that of the second, reduced-price bottle to trucks. While the distortion caused by the incremental method is not as large as this, trucks nonetheless receive preferential treatment under this approach.*

Please comment on the COB analogy.

The analogy is actually quite good, although admittedly distorted. The incremental method is based on an analysis of the cost of a "basic" highway and of the successive increments of cost occasioned by increasing size and/or weight requirements. You will recall that the "basic" highway is defined as that minimum highway facility required to accommodate the lightest vehicle group - automobiles and light trucks. The cost of the "basic" highway, the first bottle of aspirin, represents the minimum first purchase and is allocated to all vehicles regardless of size and/or weight on a uniform basis. The "bargain bottle" finds a distinct parallel in the relief provided by the increasingly non-linear pavement strength which results from additional small increments of pavement cost/depth occasioned only by the heavier vehicles.

From a cost-effectiveness standpoint, the CBO analogy breaks down rapidly; however, since one-cent sales are only occasional promotional gimmicks, while the physical attribute of disproportionately increasing strength is a continuously available boon. A more appropriate "aspirin" analogy might be to suggest that all regular aspirin on the market be assigned to passenger cars with the "extra strength" kind mandated for trucks. The truck would pay for as much aspirin per bottle as the passenger car, but would also pay the incremental difference in cost for any "extra" ingredients required.

Question 7

Is there anything about the incremental approach, besides the fact that it has been used before, that makes it preferable to the approach advocated by DOT? How is the incremental approach technically sound for allocating pavement 4-R costs?

The 4-R Program (Resurfacing, Restoration, Rehabilitation and Reconstruction) runs the gamut from bordering on maintenance to substantial construction. These different categories would not necessarily all involve the same procedures nor are the procedures involved equally sophisticated with respect to their intended responsiveness to surface life traffic demands. The FHCAS project places all four into the catch-all category called Rehabilitation.

As pointed out in the written testimony presented, overlay design practices lack any close correlation with projected strength (ESAL) requirements. The statement from the following technical source, National Cooperative Highway Research Program Report 128 - Evaluation of AASHO Interim Guides for Design of Pavement Structures, is repeated for your convenience (emphasis added by WHI):

> "On the basis of the findings of this investigation, the following major conclusions are drawn:
>
> "1. The Interim Guides were established on the basis of findings for one of a myriad of possible environmental, material, and construction conditions. Engineering judgment, together with some theoretical considerations, were used to extrapolate the results to other conditions. Unfortunately, the relative effect of each of the variables affecting the pavement design has too often been overlooked.
>
> .
>
> .
>
> .
>
> "7. The review of current overlay design practices indicates that the few design methods available account for wheel load stresses only, with no consideration of stresses resulting from volume changes. Of the procedures available, only those using deflection measurements evaluate the load-carrying capacity of the in-place pavement.
>
> "The flexible pavement design portion of the Interim Guides has been used in the design of overlays, but such an application is an extension of the empirical relationships beyond their limits. This is especially true with regard to its use with rigid pavements, because there is no basis in AASHO Road Test results for the assignment of structural layer coefficients to Portland cement concrete. Therefore, a more rational overlay design procedure is needed in order to account for both wheel load and volume change stresses."

Question 7 (response continued)

This authoritative source makes it patently clear that any cost attribution methodology based on a "pavement consumption" philosophy has no basis in the real world of highway engineering when dealing with a significant portion of what might be classified as "4R" work. The incremental approach, on the other hand, can be utilized to properly apportion the "4R" costs just as would be the case were the projects in fact new construction.

Again, since the common ultimate goal of new construction, resurfacing and reconstruction is to create (or recreate) the highest possible level of serviceability for some period of service life expectancy, there is no practical rational basis for a variation in cost responsibility methodology or shares. Of the procedures discussed in the FHCAS, the Weight-Added 6-step Incremental approach is the one most nearly consistent with the real-world of engineering design and travel data reliability. It is also the procedure followed in the 1965 federal study.

Question 8

In addition to the U.S. DOT, a number of States and foreign countries have, over the last several years, used the consumption approach to pavement damage. Why do you believe they have done so, and why do you call the consumption approach a "new, untested philosophy"?

The consumption approach is not new, it simply lacks anything other than a theoretical basis. The concept is easy to accept when the AASHO Road Test relationships are taken out of the design context for which they were developed since the visible signs of highway depreciation are seemingly readily attributed to trucks.

The Congressional Budget Office noted in their "Guidelines For a Study of Highway Cost Allocation" that, "If trucks were considered to be the basic vehicles instead of cars--that is, if roads were assumed to be built principally for trucks--the trucks would be assigned almost all the costs of pavement, since the incremental cost of improving an all-truck road to carry cars as well would be virtually nil." This statement illustrates precisely what occurs when the pavement consumption methodology is adopted.

The incremental approach suggests, on the other hand, that the design-vehicle regardless of size will invariably account for the bulk of the pavement "damage" which occurs over time. That is to say that pavements faithfully designed and constructed only for cars would wear out during the course of the intended service life, just as a road designed and constructed for heavier vehicles does. It is not unreasonable then to suggest that cars should assume the major responsibility for a car-only road, i.e., the basic highway, even though their use of facilities designed to accommodate heavier vehicles theoretically shows only minimal evidence of "wear." That the cost of providing additional pavement strength for heavier vehicles is extremely cost-effective is a physical fact of life and should have no bearing whatsoever on the responsibilities associated with the "basic" road.

While a principal difficulty with the pavement consumption methodology is found in the redefinition of the "basic" road, the new philosophy also introduces other problems which are not as easily resolved. In the summary of their discussion of allocating the costs of pavement, CBO states:

> "The costs of pavement should be allocated in proportion to axle-load equivalents, with two exceptions: costs attributable exclusively to weather and other environmental factors, and costs of a permanent, nondepreciating nature. In order to allocate pavement costs on the basis of axle-load equivalents, however, several questions need to be answered through further research:
>
> - What fraction of the deterioration of roads is attributable to weather and other environmental factors independent of the wear attributable to traffic?

Question 8 (response continued)

- What fraction of the costs of new pavement depreciates over time?
- Are the axle-load equivalents that were developed in the AASHO road test reliable, for all climatic conditions, in view of today's construction practices?"

It should be fairly obvious from the testimony presented that these questions have not yet been answered satisfactorily in the minds of many. Though the new philosophy results in major changes in the vehicular responsibility shares, there is no broad-based data or research which supports the real-life vallidity of the pavement consumption concept.

Question 9

Do you believe that the incremental method as used in the Federal study submitted to Congress in the 1960's adequately treated pavement rehabilitation costs? Is it based on how pavement 3-R costs are occasioned?

Yes. As stated in the Supplementary Report of the Highway Cost Allocation Study, February 1965:

> "No cost-allocation method gives a final and indisputable answer; but the incremental method is so thoroughly grounded in the results of highway engineering research that its findings should command respect and confidence. In basing the analysis of pavement cost responsibility on the results of the AASHO road test at Ottawa, Ill., the incremental study utilized the most recent and most authoritative information available on the effects of load applications of varying frequency and magnitude on rigid and flexible pavements of different designs."

Quoting further:

> "Through-traffic road expenditures were grouped into five types of construction operation, namely: (1) Construction on new location; (2) reconstruction; (3) major widening (added lanes); (4) minor widening (added lane width); and (5) resurfacing. Differences among the first three types of work are of significance to the differential benefit study but not to the incremental solution. Each of these three operations involves the construction of all pavement components to a width of two or more lanes. For any given environment and volume and composition of traffic the pavement design and the incremental variation of pavement cost with axle load are the same for all three types of new pavement construction.
>
> "Minor widening also involves the construction of all pavement components but to less than the width of a lane. The width increment of one-half foot is a greater proportion of the cost of a narrow widening strip than of a full lane. Accordingly, the increments of pavement thickness computed for new construction were also used for minor widening but the greater impact of the width increment was taken into account in converting pavement thickness to construction cost.
>
> "The AASHO road test staff made a study of the effectiveness of asphaltic concrete overlays on 99 flexible pavement sections and 18 rigid pavement sections, but as reported on pages 112-115 and 203-204 of Highway Research Board Special Report 61E (2), attempts at mathematical analysis designed to establish specific relationships between performance and overlay design were not successful. Since increments of resurfacing thickness could not be computed by means of the road test equations it was assumed that the incremental variation of resurfacing costs is the same as that of the bituminous surface used for new construction."

Question 9 (response continued)

The primary difficulty being encountered with the questions posed has to do with how costs are actually occasioned. Although the CBO guidelines adhered rigidly to the concept of "occasioned costs," the term was, in effect, redefined and used in a different sense than ever before used in the field of highway cost allocation. The following quotation from the CBO Guidelines illustrates this and points to the intended deviation from generally accepted engineering practice:

> "In most earlier highway cost-allocation studies, including those prepared by the Federal Highway Administration (FHWA), equity has been interpreted to mean that each class of vehicles should pay for those highway costs for which it is responsible. That is, each class of vehicles is assigned the costs that it occasions. Since there are several ways in which the principle of occasioned costs can be interpreted, many questions remain about the best way of applying it.
>
> "In the past studies the interpretation of uniquely occasioned costs has been narrow--based largely on structural or engineering principles. A somewhat broader interpretation is proposed here. In particular, it may be more appropriate to allocate some costs on the basis of the function of the new road or improvement--that is, the reason for building the road rather than the way in which it is built. If the primary function of a new road or improvement is to meet the needs of a particular class of vehicles, the resulting costs should be assigned to vehicles of that class. For example, the cost of a program to repair or replace coal roads should probably be assigned solely to the classes of heavy trucks that require those roads.
>
> "There is nothing inherently wrong with determining occasioned costs by analyzing engineering details and assigning their costs to the vehicle classes responsible for them. In some instances, however, such an approach is unduly restrictive, since it focuses only on the way road improvements are made and ignores the reasons for making them."

This line of thought ignores the multiple use function exhibited by nearly every roadway. Carried to its logical conclusions, this type of reasoning would suggest that the U.S. Defense Department should have fully financed every roadway overcrossing on the National System of Interstate and Defense Highways since the minimum clearance provisions for the bridges was not only established by but was also later revised upward at great cost to accommodate military transport functions.

Hopefully, U.S. DOT did not fully follow this CBO lead; nevertheless, considerable wheel spinning resulted from many of the blind alleys into which the study was initially directed. The CBO "drive" to redefine common costs as a charge-back to particular classes of vehicles has apparently resulted in considerable effort being expended to derive and/or contrive "occasions" to explain virtually all costs--even though, in most cases, the standards adopted were empirical in nature and many attributable simply to "comfort and convenience."

Question 10

Both DOT's recommended cost allocation approach as well as the incremental method show that the lighter trucks have been subsidizing heavy combination trucks. Do you believe there should be a redistribution of tax responsibility among truck classes or should this subsidization continue?

Webster's dictionary defines "subsidy" as:

> "a grant by a government to a private person or company to assist an enterprise deemed advantageous to the public."

While many intriguing arguments could be advanced as to why the Congress might have chosen to structure the federal highway user taxes to encourage the use of more productive equipment, it is clear that the mere finding of over- or underpayment by vehicle classes does not rise to the level of conscious social policy. Using the same logic, one could look at Table I-7 of the FHCAS and say that lighter trucks are also subsidizing small passenger cars who are subsidizing motorcycles who are subsidizing buses. The possibilities of governmental largess are endless. But of all these relationships, only the exemptions granted intercity and other buses in 1978 to encourage energy conservation can be reasonably termed a subsidy.

Changes in vehicle numbers and use outside of predicted patterns can upset the careful cost responsibility assignments of earlier cost allocation studies (assuming that has occurred; note that Table I-6 predicts that even under the current tax structure the share of federal user charges paid by heavy combinations will grow at a faster rate through 1985 than that paid by lighter trucks). The purpose of this cost allocation study is to help realign payments with cost responsibilities where such changes have taken place. Congress can, at that point, consider the need for any true subsidies. But to use the term "subsidy" at this stage and in this context is to unnecessarily charge the air with social policy considerations and to divert attention from whether the FHCAS has properly completed its task.

Question 11

Mr. Kiley stated at the August 10, 1982 hearing that DOT had "queer figures" on light trucks and that the Federal data are questionable. How would you differ with the procedures used by DOT to estimate truck population?

This particular element of the federal project was clearly fraught with problems; however, WHI has no "special" information concerning the validity of the procedures and assumptions upon which the authority of this element of the DOT work rests.

Question 12

Cars are becoming smaller and lighter while trucks become larger and heavier. Also, the percentage of cars in the vehicle traffic stream is declining while the percentage of combination trucks increases. Why then shouldn't the heavier vehicles assume a larger share of Federal road-use taxes?

Cost allocation studies are far more complex than simple comparisons of size and weight trends and vehicle class population statistics. As examples of complicating factors, the costs of the particular road systems typically used by each vehicle class vary significantly, but only incidentally in proportion to those characteristics which are either size and weight or travel related.

Changes in vehicle size and weight may, in fact, introduce changes in highway cost responsibility that would surprise the layman. Through application of the federal bridge formula (formula "B"), the use of longer and heavier combinations results in lower axle weights and reduces the number of trucks necessary to move the same amount of freight. These are highway cost savings. Conversely, the "downsizing" of passenger cars has required some redesign of guardrails and reworking of highway sight distances--increased costs unforeseen by most people.

But the fact is that heavier vehicles are already assuming an increasingly larger share of Federal road-use taxes. Table I-6 shows the combination share increasing from 16.3% in 1977 to 26.5% in 1985 under the current tax structure, with the share paid by passenger cars dropping from 55.6% to 38.7%. As page I-10 correctly states, this swing is due in part to the current federal highway user tax structure. Not only have passenger cars increased in fuel efficiency more than have trucks, but trucks pay excise taxes on new vehicles and on parts and accessories plus a highway use tax, none of which is borne by the passenger cars. These truck-specific taxes will continue to increase the share of federal road-use taxes paid by heavier vehicles. It would appear that the current tax structure is having the effect desired in the question.

Question 13

Most of the objections to the Federal cost allocation study heard in our recent hearings have come from the trucking industry. To your knowledge, are there other major groups critical of the study?

The intensity of response can undoubtedly be correlated with the severity of the "pain" inflicted; however, WHI's role is one of technical research and no effort has been allocated to monitoring the responses of other groups.

Question 14

Highway engineers and pavement experts often point to the interactive effect between loads and environmental factors. Has this interactive effect been analyzed by the trucking industry?

You are obviously aware of the two technical research projects which were commissioned by the American Trucking Associations and the Motor Vehicle Manufacturers Association. Both of these studies deal with the subject area and further the basic understanding of the significance and magnitude of this concern. While answers to these questions are desperately critical to the credibility of the pavement consumption philosophy of the FHCAS, the interactive effects of loads and environment have not been fully analyzed and are not fully understood by the trucking industry or anyone else, to our knowledge. It is hoped that the Long Term Monitoring Project referred to in question 17 may further the understanding of these complex relationships.

Question 15

Does DOT's use of vehicle miles of travel rather than axle miles to allocate basic pavement thickness result in a lower or higher cost assignment to heavy vehicles?

This question apparently presumes an understanding that, as used, the term "basic pavement thickness" correlates with DOT's new theoretical "minimum pavement thickness" and should not be confused with a practical minimum pavement thickness as associated with the Incremental concept of a "basic" highway. As noted by FHCAS, "The portion of thickness that is greater than the minimum pavement thickness is assigned to all vehicles based on their contribution to the need for that thickness."

With respect to the DOT methodology, FHCAS indicates that:

> "In the recommended approach, however, the costs of the minimum thickness pavement have been divided into 10 groups based on width requirements, but have not been assigned to the vehicles comprising those groups. For this purpose, the residual allocator is used. As discussed in Chapter IV, the residual allocator used here is VMT, although other use measures could be just as appropriate.
>
> "Use of the residual allocator for within-group costs means that each group's costs are assigned to the vehicle classes represented in the group based on the proportion of use by each class within that group."

Taking these statements at face value, the costs for each general class of vehicles were apparently predetermined and then simply reallocated to the more detailed breakdown of vehicles within each general class in proportion to the appropriate VMT measure of usage as estimated. If this understanding is correct, the measure of use, be it axle miles or vehicle miles, has no specific bearing on the actual total cost allocated to the general class category referred to as "heavy vehicles."

Question 16

Would heavy trucks be assigned a greater cost if bridge repair costs were treated as residual rather than directly attributable costs? Does the new DOT study assign more bridge repair costs to heavy vehicles than the 1965 DOT study?

Most bridge repair costs are not load related and should be treated as residual. However, WHI's limited resources have not yet been extended to a full investigation of the bridge repair aspects of the FHCAS. Therefore, no authoritative response can be made to these questions.

Question 17

As a part of the Section 506 study the Federal Highway Administration established a pavement long-term monitoring process. Do you agree with FHWA's approach on LTM?

Background citations from FHCAS (WHI emphasis added):

> "Section 506 of the Surface Transportation Assistance Act of 1978 *directed* the Secretary of Transportation to study and investigate "... the need for long-term or continuous monitoring of roadway deterioration to determine the relative damage attributable to traffic and environmental factors."
>
> "In response to the congressional mandate, *a pilot study*, the Pavement Long-Term Monitoring (LTM) Program, has been established to assess the problems in building a data base that can provide improved information on pavement performance relationships. *If this pilot study shows promise*, it will be placed on a firmer statistical basis and State participation will be broadened."
>
> "... The FHWA, in cooperation with AASHTO and selected States, initiated the LTM program. It has been structured as a cooperative effort to demonstrate and share information on innovative pavement monitoring techniques and to establish a core number of case study sites (*a minimum of ten sites per State*) to be monitored over at least a *ten year* period."
>
> "This program as presently structured will assist *eight* States with development in *each* State of: (1) a pavement monitoring system for statewide program analysis; and (2) detailed case studies of traffic and pavement deterioration history to understand exactly which axle loads and environmental factors are being applied to specific pavement sections. This effort will be closely coordinated with the Highway Performance Monitoring System (HPMS) and the AASHTO Joint Task Force on Pavement."
>
> "*Each* of the eight participating States will identify its pavement monitoring data needs for statewide program analysis, project analysis, and case studies. *Each* will develop a survey design for monitoring the identified data needs in terms of sample size and frequency so that sufficient information is available to make a well-informed decision concerning pavement management. These State pavement monitoring programs will then be reviewed by an advisory panel of experts that will provide comments on how *each* State could improve its pavement monitoring program. *Each* participating State will then operate *its* pavement monitoring program for *one year*, and at the end of that time, *each* program will be thoroughly documented by means of a report with the information obtained, analysis performed, cost to obtain the data, and recommendations concerning the best methods to perform long-term pavement monitoring. The States are *expected* to continue monitoring pavement performance at the case study sites beyond the pilot period."

Question 17 (response continued)

In 1964, NCHRP Reports 2 and 2A strongly recommended a program of so-called Satellite Road Tests, in which pavements would be observed over a wide range of environmental conditions across the United States. These tests would have been structured to examine the interactions and separate relationships of use and non-use elements of pavement damage. That approach was generally rejected in 1964 by funding agencies capable of undertaking the study on the basis that it would take too long, 10 to 15 years, to obtain significant results.

The federal/state LTM program appears to be the first significant step being taken to further examine the possibilities associated with the research program recommended in 1964. The one-year pilot study now underway may provide signficant direction for an expanded national effort--then again it may not. Unless the ultimate program is scientifically developed with a proper experiment design, and unless a realistic commitment is made to maintaining the broader-based observations over a period of at least 10 years, the results will not provide a useful basis for an authoritative national-level analysis.

Question 18

Do you believe all trucks should pay the same rate of excise taxes regardless of how many miles they are driven per year, or should miles driven be reflected in all the tax rates rather than just in the fuel taxes?

Strictly speaking, the excise taxes in the current federal highway user tax structure are levied upon certain transactions--the purchase of new trucks and trailers, parts, tires, etc.--and not upon the amount of subsequent use made of the items purchased. Sales taxes on consumer products in our personal lives similarly make no inquiry into ultimate use; we simply accept the tax as part of the cost of acquisition. Redesigning the excise taxes to reflect amount of use would thus require a whole new legal foundation, one that would make both the transaction and the amount of use the taxable incidence. They would no longer be true excise taxes.

In practice, however, the excise taxes do reflect the amount of use because the greater the travel by a truck, the more frequent the need for these taxable items. While this may appear to be a roundabout way to tax highway use, the excise taxes offer advantages over the two more direct methods of highway use taxation:

- Unlike fuel taxes, the excise taxes can be narrowly defined to reach certain vehicle classes and thereby help to fine-tune recovery of cost responsibility.
- Unlike mileage taxation systems, excise taxes capture tax revenues at the point of a transaction with a third party, reducing the evasion common to self-assessed taxes and eliminating one level of governmental administration.

Collection of a new use-related "excise tax" could be accomplished realistically in only two ways: through different tax rates on the same items at the point of transaction--a nightmare for businessmen--or through a federal mileage reporting system with credits and refunds, a large bureaucracy, and substantial evasion. These steps appear to be unnecessary because the interrelationship between excise taxes and use is already occuring naturally.

Question 19

Several States have a weight-distance tax and maintain that they are able to administer and enforce it successfully. Proponents say the tax is a good way to track the damage responsibility of heavy trucks. In the interest of equity, shouldn't a Federal weight-distance tax be considered, along with an increase in the fuel tax?

It is not surprising to hear states with mileage taxes defend their systems, for these states have a considerable philosophical and financial investment in them. For example, Oregon, regarded as the prototypical weight-distance tax state, utilizes 66 ports of entry and weigh stations, border and internal, whose primary purpose is to record the movement of trucks. The cost of construction and maintenance of these facilities--and the staff to man them and process the records--is an investment Oregon (or any other mileage tax state) is not likely to speak poorly of. An idea of the extent of that financial investment is given in the January, 1980 Report of the Oregon Senate Interim Task Force on Regulation of the Motor Carrier Industry (the Oregon weight-distance tax is administered by its PUC), which recommended three new permanent ports of entry, ten new portable ports and 192 additional staff to enforce the weight-distance tax at a cost of $12 million to the state.

FHWA officials have recently acknowledged that a federal weight-distance tax at this time would have to be administered by the states. Few states have an existing enforcement infrastructure like that of Oregon. Few even have the $12 million available that the Oregon report sees as needed to bring Oregon's already extensive enforcement network up to snuff. Aside from enforcement in the field, 40 of the 50 states do not have a bureaucracy in place to administer a federal weight-distance tax. It is hard to believe that an Administration committed to states' rights would contemplate mandating state administration of a federal program of this magnitude.

While it may be understandable that states with mileage taxes argue their success, the facts--from the states themselves--say otherwise. More states have tried and abandoned mileage taxes than currently have them. Here are a few of them:

In 1929 Georgia imposed a mileage tax. The Georgia legislature repealed it in 1927. According to the figures of the state's comptroller, administrative costs ran to over 21 percent of gross revenues.

Iowa tried a ton-mile in 1925 and threw it out 14 years later. The Superintendent of the Iowa Motor Vehicle Department said, "in the collection and actual enforcement involved in the collection of such tax, no successful means has as yet been found at a reasonable cost." An academic study noted, "experience with the ton-mile in Iowa and other states indicates that it is difficult to administer because it involves self-declaration...of ton-miles traveled...(and) payment of the full tax is...open to evasion."

Minnesota passed a type of weight-distance tax in 1936. It was repealed in 1949.

Question 19 (response continued)

Oklahoma dropped its mileage tax in 1939 after 16 years of frustration and a 1935 bill calling for from 25 to 50 ports of entry (in Oklahoma!) to collect the tax.

Tennessee reported that "a large force of state employees was required to check and maintain" tax records for the mileage tax that state repealed in 1939.

West Virginia repealed a ton-mile tax in 1951.

Wisconsin had its ton-mile tax declared unconstitutional in 1953 after exemptions necessary to reduce administrative headaches had riddled its application.

Kansas, Utah and other states have also tried and rejected weight-distance taxes.

The experience in current mileage tax states--when actual state reports are examined--is not much more encouraging. The Oregon "Motor Vehicle Cost Responsibility Study 1980" puts administrative costs of its weight-distance tax at $8,588,683 (page 4-18), which page B-5 calls "10% of total tax receipts." That 10% figure actually calculates to 12.32% when compared to the revenues reported on page 6-11 and to 17.52% when compared to the weight-distance tax revenues Oregon reported to the FHWA, as shown in Highway Statistics 1980. That $8,588,683 does not include the costs of weight enforcement. Oregon's costs of weight-distance tax administration clearly fall within the 10-20% of tax revenues historically reported for mileage taxes.

Colorado exemplifies the other major problem with mileage taxes--they are unenforceable. The May 1982 Report of the State Auditor on Colorado's gross ton-mile tax estimates noncompliance (page 7) as between .9% and 31.1%--in other words, no one knows how much tax should be paid. Nor does Colorado know how many taxpayers there should be or how many tax-eligible vehicles exist in the state (page 23). But 31.5% of Colorado's accounts pay less than $25 a year (page 8), and poor recordkeeping on the part of these taxpayers prevents the state from proving the suspected substantial noncompliance (page 8). These state figures are themselves just estimates--Colorado is 3,000,000 port of entry weight tickets behind in its data processing (page 30).

The experiences of states which have tried or currently have mileage taxes do not recommend their adoption elsewhere, much less on a national basis. While proponents of weight-distance taxes suggest that mileage reporting systems are already in use across the nation, the most extensive of them, the International Registration Plan (IRP), covers only 28 states and the system does not include reporting for the tremendous number of intrastate vehicles.

There is no equity in a tax that cannot be collected. There is no efficiency in a tax that cannot be collected without substantial enforcement and administrative costs. Mileage taxes have been shown by state experience to be neither equitable nor efficient.

Question 20

Some of the states presently impose a differential gasoline and diesel fuel tax. The DOT study suggests that consideration be given to such a fuel differential at the Federal level. Since diesel powered vehicles have greater fuel efficiency and do not contribute as much revenue per mile of travel as gasoline powered vehicles, why wouldn't this be a fairer way to tax?

Many federal actions in the past decade have promoted the conservation of energy. In particular, the 1978 exemptions from federal highway user taxes granted intercity buses were made in the name of fuel conservation. Gains in vehicle fuel efficiency have been widely hailed as a step toward our nation's energy independence. Indeed, passenger car manufacturers have been held to Corporate Average Fuel Economy (CAFE) standards, with substantial penalties for failure to achieve increased fuel efficiency. A system of differential fuel taxation which would impose heavier taxes on those vehicles presumed to be more fuel efficient must be recognized as running counter to the recent federal emphasis.

Viewed apart from social policy considerations, the differential fuel tax theory rests on bringing into balance the lower fuel tax payments per mile of fuel efficient vehicles. If this concept of equity is accepted, it should be applied across the board--regardless of type of fuel or class of vehicle--for the greatest advances in fuel efficiency recently have been made among gasoline-powered passenger cars, not among diesel-powered, heavier vehicles. As the FHCAS itself notes on page I-10, small passenger cars were found to be underpaying by 30% largely because of their fuel efficiency.

But mileage ratings are a small part of the fuel efficiency (and fuel tax payment per mile) story. A larger role is played by driving habits and vehicle maintenance. No one seriously suggests higher taxes on good drivers and properly maintained vehicles, yet the selection of a fuel efficient vehicle is equally an exercise of good judgment.

Actually, the growth of diesel-powered vehicles among the heavier truck classes is not as much due to diesel fuel efficiency as it is to the high-torque characteristics and reliability of the diesel engine. Owners of diesel trucks already pay taxes for these advantages:

- Diesel trucks cost more initially, so the purchaser pays the 10% federal excise tax on this premium.

- Diesel parts are more expensive than comparable gasoline engine parts. The federal excise tax on parts applies here.

- Diesel vehicles obtain less tire mileage on tires used on drive axles, so more is paid in federal excise taxes on tires and tread rubber.

- Diesel trucks tend to be heavier than do comparable gasoline-powered trucks, reducing payload and increasing state and federal registration and weight fees.

Question 20 (response continued)

These diesel truck tax payments are not reflected in fuel tax per-mile figures.

A differential fuel tax cannot be equitable unless applied to all fuels and all vehicle classes. The car manufacturers, subject to CAFE penalties, would certainly be wary of any effect a differential fuel tax would have on sales of small cars. The complexity of administering such a federal diesel differential fuel tax is shown by FHCAS Alternative 2D, a call for individual vehicle accounts and refunds, all to tax what constitutes only 4% of the United States truck population, according to the 1977 Truck Inventory and Use Survey, U.S. Department of Commerce.

Question 21

DOT has suggested that the present annual heavy vehicle use tax be graduated as a function of weight rather than remaining constant across all weights and in addition that the tax be assessed directly on vehicles' registered gross weight. Wouldn't these changes more fairly assign cost responsibility?

The purpose of any highway user tax is not to "fairly assign cost responsibility" but to collect that cost responsibility fairly assigned (hopefully) by a cost allocation study. This is more than semantic quibbling because the focus on one highway user tax alone tends to overlook three important facts:

- A highway user tax structure must be judged by the total cost responsibility recovered from a vehicle class.
- No one highway user tax operating alone can achieve tax equity because the fine-tuning necessary to account for differences in individual vehicle use will be quickly counterbalanced by administrative and enforcement difficulties.
- The more detailed a tax, the less incentive there is to comply and the more costly it is to collect. No tax can be equitable if it is not collected.

With the above considerations in mind, the assessment of the federal highway use tax directly on the vehicles' registered gross weight would have some administration advantages because most states already register heavy vehicles on a gross weight basis. The federal highway use tax reports could then be cross-checked more easily with state records for enforcement; or if the states were to collect the federal highway use tax themselves (see question 23), they would be familiar with the taxation basis.

A graduated federal highway use tax would be similar to the graduated registration and weight fees found in most states. These first-structure taxes act as an admission ticket to the highway system. They are imposed for having the system "ready" and are not intended to reflect actual use then made of the system. Assuming that a graduated federal highway use tax would likewise adhere to the purpose of a first-structure tax, the remaining concerns would be the tax rates and the ease of calculation. These concerns could be answered only with respect to a concrete proposal.

Question 22

What percentage of the truck use tax would you estimate is not being collected at present? How could administration and compliance be improved?

WHI has participated in discussions with the Internal Revenue Service (IRS) and the General Accounting Office (GAO) on collection of the federal highway use tax. Our impression from these discussions is that the tax can be easily evaded. It is a self-reported tax, has not received adequate publicity, and has not been accorded much enforcement emphasis within the IRS. There is no uniform national enforcement procedure employed by the IRS-- each regional office is left to its own devices. One such regional office visited by WHI had but one person manually checking records and writing letters to taxpayers--that person has been subsequently released. Field enforcement was left to agents handling many other (and higher revenue) tax matters, with the result that federal highway use tax audits tended to be conducted only on large companies--who were also being audited on those other taxes. WHI has no direct estimate of noncompliance, but we found it alarming that enforcement was so haphazard.

Improvements in collection subsequently have been made through the state trucking associations, who are informing their members of the tax and distributing reporting forms. But full collection will only be possible with a consistent national enforcement procedure, better notice to potential taxpayers, and collection of the tax at the point of a transaction (such as state registration). Self-reporting is a loser; noncompliance can only continue.

One further concern of WHI is the unequal treatment accorded various international vehicles. While the tax is clearly imposed on all motor vehicles over 26,000 pounds using the public highways of the U.S.,just who is liable for that tax has been muddled, especially on the international level. The origin of this confusion is subsection (b) of Section 4481(Title 26, Chapter 36, United States Code), which reads:

> (b) By whom paid
>
> The tax imposed by this section shall be paid by the person in whose name the highway motor vehicle is, or is required to be, registered under the law of the State in which such vehicle is, or is required to be, registered, or, in case the highway motor vehicle is owned by the United States, by the agency or instrumentality of the United States operating such vehicle.

Vehicles operating in the U.S. under foreign registration do not allow for simple determination of the liable person. Rulings by the IRS have not completely resolved this problem. As a result, some foreign carriers have paid the tax over the years and some have not, both with some justification. The most recent ruling, Revenue Ruling 81-86 issued March 16, 1981, stated that Canadian vehicles operating in the U.S. under the Uniform Vehicle Registration Proration and Reciprocity Agreement (UVRPRA) created liability for the tax in the name of their registered owners because the UVRPRA specifies that such vehicles are "registered"

Question 22 (response continued)

in each state. The ruling applied prospectively as of July 1, 1981, intimating that Canadian carriers who had paid before that date were due refunds. The ruling did not mention operations under the International Registration Plan (IRP), where vehicles are "deemed" registered outside their base-plate jurisdiction. The ruling definitely did not affect purely reciprocal agreements between provinces and states. Vehicles operating under reciprocity remain exempt from payment under Revenue Ruling 57-224.

The net result for Canadian carriers is that those operating in the U.S. under the UVRPRA are liable, those under reciprocity are exempt, and those under the IRP are currently exempt but apt to be held liable sometime in the future. U.S. based vehicles, meanwhile, bear 100% of the tax no matter how much time they may spend outside of our country.

This disparity of treatment could be remedied through international apportionment of the tax, much like registration fees are apportioned, or prorated, under the IRP, the UVRPRA, and the Canadian Agreement on Vehicle Registration (CAVR). That share of the tax would be due for that share of total miles a vehicle traveled in the U.S. To compute tax due, the vehicle's U.S. miles would be divided by its total miles everywhere and that percentage would be applied against the total tax otherwise due for the vehicle. Of course, the opportunity to apportion the tax would be equally available to U.S.-registered vehicles traveling into Canada.

The theoretical justification for apportionment applies to the Federal Highway Use Tax as much as it does to jurisdictional registration fees. The tax is for the privilege of using the U.S. highway system for one year. However, that privilege is valueless for the portion of the year the vehicle travels outside the U.S. Mileage is used as a measure of time to properly apportion the tax to reflect the portion of the year when the privilege had value in each case.

International apportionment of the federal highway use tax and an amendment to Section 4481(b) to make the person liable in whose name the foreign-based vehicle is registered could help assure full and fair compliance with the tax. Until compliance is improved, however, increases in the tax rates will serve only to compound current problems.

Question 23

What is your view of the States participating in the collection of the truck use tax?

State collection of the federal highway use tax would be a good step toward full collection (hence, equity)--all within existing tax structures and tax collection mechanisms.

From an administrative standpoint, a good tax is one that is unavoidably paid by the taxpayer at the time the taxpayer is obtaining a necessity. Efficiency is obtained because the taxpayer cannot avoid payment of the tax. Costs of administration are kept low because the government has a third party, the purveyor of the necessity, to keep track of the taxable transactions. Equity, on the other hand, is obtained through proper rates--considered within the context of the total tax structure--on the various vehicle classes.

From a taxpayer standpoint, a good tax is somewhat predictable for purposes of business planning, requires minimal record keeping outside of that normally done in the course of business, returns a high percentage of tax revenues to their dedicated use, is fully collected, and has rates that properly reflect the purpose of the tax. The latter two factors--full collection and proper rates--go hand in hand for the taxpayer. No tax is equitable unless collected, and no tax increase is fair unless borne by all.

The federal highway use tax is currently open to noncompliance. Those who do pay the tax merit improved collection of the tax before being asked to bear an increase in the tax rate. State collection of the federal highway use tax at the time of vehicle registration would meet the criteria of a good tax from both the administrative and taxpayer points of view while solving the noncompliance problem. If done in every state, the vehicle license plate would become visual evidence of federal highway use tax compliance. Indicia could be issued to foreign-based vehicles operating in the U.S., allowing apportionment of the tax internationally, as discussed in question 22.

Recognizing that there are many details to be discussed before state collection could be implemented, two approaches suggest themselves. First, certain states could act as pilot programs under IRS supervision. Already California has passed legislation allowing the state to study its collection of the federal highway use tax at time of registration and discussions have begun with the IRS. Second, the Secretary of Transportation could seek the advice of state motor vehicle administrators (through the American Association of Motor Vehicle Administrators) and of trucking industry licensing experts on the way the many registration and use tax details (e.g., quarterly payments, county level registration) might best be handled. From both approaches a uniform system of state collection can be developed. The states collecting the federal highway use tax could be allowed to retain a percentage of their collections to cover their added administrative costs--or the states could be allowed to retain all of their use tax collections as an advance on their federal funding participation.

Questions 24 and 25

What are your views on the current taxes on tires, tubes, and tread rubber? Should any of these taxes be eliminated or modified?

Similarly, what changes, if any, would you suggest in the current taxes on new trucks, truck parts and accessories?

Determinations and/or recommendations concerning these specific taxable items and the associated taxation rates deemed appropriate are basically policy issues and are outside the realm of the technical mandate under which WHI functions. While there are definite pros and cons associated with each of these questions, the testimony of other responsible authorities will undoubtedly provide the insight which the Subcommittee is seeking on these matters.

Question 26

Several States have implemented an indexed fuel tax. What is your opinion on indexing?

Fuel tax rates may be varied in three ways: administratively, by a fixed percentage, or by an index. Each of these ways, judged by tax principles generally accepted by the trucking industry, are fully discussed in the following paper, "On Variable Fuel Taxes." That paper also outlines many of the features necessary to produce a variable fuel tax law compatible with these tax principles and evaluates the overall effectiveness of variable fuel tax laws.

ON VARIABLE FUEL TAXES

Basic Principles of Taxation

The trucking industry's traditional position on taxes is that the industry is willing to pay its fair share of taxes to support proven highway needs as long as such highway user taxes are levied in an equitable manner and the revenues are not diverted to non- highway uses. Along with those basic principles of taxation, the industry looks for taxes and tax collection methods which are easy to administer, do not require difficult record keeping, and are somewhat foreseeable for purposes of business planning.

Ideally, fuel tax rates would continue to be set by the state legislatures and in the traditional cents-per-gallon approach. The legislatures are politically accountable, which is why they have been given the constitutional control over taxes. Legislatures also make the determination of highway needs, through the appropriation process, if not through direct approval of highway programs; and highway user taxes should be related to highway needs.

In today's climate of inflation, reduced fuel consumption and legislative hesitancy to raise taxes, variable fuel taxes are a commonly considered option. Given that direct control of fuel taxes may no longer be chosen by the legislature, the variable fuel tax adopted should still satisfy the basic principles of taxation. And two more principles should be added: The variable fuel tax should in no way interfere with or supplant the legislature's determination of highway needs. The method chosen to vary the fuel tax rate should be relevant, certifiable, and produced by an unbiased source.

Varying the Fuel Tax Rate Administratively

Fuel tax rates may be varied in three ways: administratively, by a fixed percentage, or by an index. Direct administrative control of the fuel tax rate is a complete abdication of legislative responsibility and, without legislative guidelines, would probably be unconstitutional. Direct administrative control is counter to the principle above that the method of varying the fuel tax rate come from an unbiased source.

Question 26 (response continued)

Varying the Fuel Tax Rate by Fixed Percentage

A fixed percentage may be applied to the wholesale or retail price of fuel. This may be done as an extension of the state sales tax or separately. A percentage of the price of fuel is probably the most popular variable fuel tax method among state administrators because it will likely produce the most revenue. It is also somewhat relevant to highway costs (as opposed to needs), as petroleum products make up a good part of highway construction materials.

However, a percentage of the price of fuel is probably the worst variable fuel tax method from the highway user point of view. Fuel prices are volatile, making tax planning difficult, both by highway users and by the state. As prices fluctuate, the revenues produced can far outdistance or lag behind proven highway needs. Higher revenues have an inflationary effect as govenment tends to spend up to revenues available. Also, growing highway funds attract non-highway interests intent on diversion. The highway user ends up paying more taxes for non-vital projects or non-highway uses. Lower revenues mean needs go unmet.

The state also loses under a percentage approach if the state determines the price of fuel by means of a survey. Surveys cost money to administer. Using an average price of fuel for the various grades of fuel means that those who buy lower-priced grades (e.g., diesel) tend to be taxed more heavily than those who buy higher-priced grades of fuel. The administrative costs of surveying fuel prices can be avoided by using the average fuel prices published by the U.S. Department of Energy; however, the tax differential between users of different grades of fuel will still exist unless the averaging also takes into account the volumes sold of the different grades of fuel.

Keeping track of fuel purchases at different prices can entail complex record keeping and problems with refunds and audits, but probably the most objectionable feature of this variable fuel tax method is that it ties our tax system to the unpredictable, uncontrollable actions of OPEC. That is poor tax policy. The retail price approach compounds the situation by adding the vagaries of retail pricing to the mix.

If a percentage of fuel price must be chosen as the variable fuel tax method, then the best of a bad lot is the average wholesale price of fuel, before federal taxes, as published for state or region by the U.S. Department of Energy.

Varying the Fuel Tax Rate by "Indexing"

"Indexing" is a current buzzword in tax circles, and applying an index to the fuel tax rate is the third possible variable fuel tax method. An index is an indicator of the economy or of inflation as published by an independent source. Three indices have been considered for fuel tax application: the Consumer Price Index; the Highway Construction Cost Index; and the Implicit Price Deflator (also called the Gross National Product Deflator).

Question 26 (response continued)

The Consumer Price Index (CPI) is produced by the Bureau of Labor Statistics, U.S. Department of Labor. It is a measure of inflation in consumer spending. The CPI takes the spending pattern of a base year for items in a consumer's market basket and updates the prices of those items, weighted according to that base year spending pattern. The CPI has the advantage of reflecting inflation, including fuel prices, and of being familiar to the public. There are no survey costs to the state and the CPI is published for Standard Metropolitan Statistical Areas (SMSA's), as well as for the nation.

On the other side of the coin, the CPI tends to overstate inflation for two reasons. First, it considers only consumer spending, as opposed to capital investments for example, and not the total economy. Secondly, the CPI does not rapidly update the spending patterns which compose its consumer market basket; its weighted average lags behind current spending patterns. It so happens that some of the items which have been subject to rapid inflation, such as housing, have decreased as a percentage of consumer spending. But the CPI does not make that adjustment quickly. And while the CPI is generally familiar to the public, it is not well liked because it rises so fast.

The Highway Construction Cost Index is compiled and published by the Federal Highway Administration. An index for maintenance costs is also compiled. The actual figures are produced by the state highway departments; FHWA merely compiles and averages them. This index is probably the most closely related to highway needs. However, it has three shortcomings. It is jumpy, being sensitive to the amount of ongoing highway construction. Highway construction cost vary between states, so the national index tends to import higher costs into less costly states. And most importantly, the Highway Construction Cost Index is ultimately produced by the state highway departments, the same people who would then use the fuel tax revenues. That is hardly the unbiased source good tax policy would call for.

The Implicit Price Deflator is produced by the Bureau of Economic Analysis, U.S. Department of Commerce. The same figures are used by the Federal Reserve Board as the Gross National Produce Deflator. The Bureau of Economic Analysis publishes this index on its Survey of Current Business, the Federal Reserve Board publishes it in its Federal Reserve Bulletin, and it is also published in Business Statistics. The Implicit Price Deflator was used by Congress in the Federal Crude Oil Windfall Profit Tax Act of 1980. It is the preferred variable fuel tax index of Chevron, USA.

The Implicit Price Deflator is computed for the purpose of comparing current GNP to a base year GNP. To make the comparison in terms of "real" dollars, the current GNP is "deflated" by the index, hence its name. The Implicit Price Deflator uses the same market basket approach as the CPI, with the important differences that the Deflator considers the total economy and it makes adjustments for changes in spending patterns. For these reasons, economists consider the Implicit Price

Question 26 (response continued)

Deflator to be the most accurate index of inflation. Of course, it considers fuel prices and highway costs in the mix, and it is produced by an unbiased source at no cost to the state. It tends to run a few points behind the CPI. On the other hand, the Implicit Price Deflator is not well known or understood by the public. Still, the Implicit Price Deflator seems the best of the indices.

Other Features of a Variable Fuel Tax Law

The method of varying the fuel tax rate is but one component of a variable fuel tax law. Fortunately, the others are easier to explain.

Ceiling and floor on rate. Imagine what fuel taxes would be if a fixed percentage of retail price were adopted ten years ago! To avoid surprises, a ceiling or maximum rate should be set. To protect state revenues, a floor should be in place, as well. Whenever either is reached, there should be mandatory legislative review to see if the system is working.

Minimal number of rate changes per year. Frequent rate changes lead to administrative costs, difficult record keeping, and public frustration. Rate changes should be made no more frequently than semiannually, but preferably only on an annual basis. This is easily done by using the annual figure published for the chosen index or average fuel price and then allowing a month before the new rate is effective. That gives time for notice to fuel dealers and adjustments to books.

Maximum that rate can change any one time. To aid business planning and to protect against short-term dislocations in the economy, there should be a maximum amount that the rate can change at any one time, say, one cent or two cents per gallon.

Rate expressed in cents-per-gallon. A percentage rate blurs the "user tax" concept. This is especially true if the state sales tax is merely extended to sales of fuel. Loss of the "user tax" concept allows diversion of highway user tax revenues. The rate should therefore be converted to cents per gallon. For administrative ease, whole or half cent divisions are preferable to tenths of a cent.

Highway trust fund strengthened. Because variable fuel taxes bring increased revenues, the threat of diversion to non-highway uses will grow. A review, and strengthening if necessary, of the constitutional or statutory provision which establishes a state highway trust fund is a recommended part of any change in fuel tax methods.

Legislative review. Variable fuel taxes can increase in a manner unrelated to proven highway needs. There is then a tendency to budget up to available revenues rather than only up to actual needs. The legislature must maintain firm control of highway spending, whether through appropriations or direct review of the highway program. In the variable fuel tax law, this means two things: Annual reports to the legislature of revenues, expenditures and forecasts for the collection of the variable

Question 26 (response continued)

fuel tax by the department in charge. And a cap on the fuel tax rate at whatever point is sufficient to produce the revenues called for by the legislative appropriations or legislatively-approved highway budget. The otherwise well-drafted New Mexico variable fuel tax law misses this point, with the result that the fuel tax revenues are not necessarily related to the highway needs.

Are Variable Fuel Taxes Effective?

Variable fuel taxes are an increasingly common response to inflation, reduced fuel consumption, and legislative hesitancy to raise taxes. If a variable fuel tax law is to be adopted, the discussion above will help produce a law that is compatible with the industry's basic principles of taxation. But are variable fuel taxes effective? Even in states where a variable fuel tax has been adopted, changes in the fuel tax rates often continue to be made by direct legislative action. In such cases, the variable feature of the law may as well not exist. And where the variable feature is allowed to operate, the legislature can still be held politically accountable for changes in the fuel tax rate. Needs estimates and revenue projections are considered by any legislature before adopting a variable fuel tax law. When the law works as projected, the legislature can truly be said to have foreseen and ordained the fuel tax rates. When the law fails, direct legislative action will, again, be needed. The effectiveness of a variable fuel tax law would appear to be no greater than the effectiveness of direct control by the same legislature.

Question 27

What effect would increasing only the Federal gas tax have on the equitable distribution of costs among the user classes?

The FHCAS reports that some 59.2 percent of the federal highway user tax revenues are expected to be derived from motor fuels by 1985. According to Table VI-17, approximately one-fifth of these motor fuel taxes would apparently accrue from the operation of vehicles described as single-unit and combination trucks. This statement of the expected revenue composition picture seems relatively forthright, but as federally stated: "Most of the revenues that go into the Highway Trust Fund are not collected directly from consumers. Instead they are paid to the IRS by the producer of the taxable product. As a result, the disaggregation of the revenue contributed by various vehicle types is a difficult task."

Further, the revenue relationships as reported synthesize only a snapshot, a portrayal of one point in time, and do not consider the dynamics of inflation on the broader picture of overall road user taxation. The FHCAS notes that: "When charges indexed to inflation are combined with other charges that are not so indexed, as is the case with the present federal highway user charge structure, the relative user charge payments by the vehicle classes are likely to change. This has happened recently as the ad valorem charges on new trucks and truck parts and accessories have increased with inflation while others have not."

Consider further the differential impacts of fuel efficiency improvements, the sensitivities of the various elements of vehicle fleet mix and travel to assumed economic projections, the effects and responsibilities associated with federal user tax exemptions, etc. Finally, integrate into the analysis the previously identified problems of defining and quantifying the equitable distribution of costs associated with a new, untested philosophy of highway cost allocation and the question posed becomes extremely hypothetical.

The FHCAS assessment reads as follows:

> "Fuel tax increases figure prominently in plans for revising user charges for several reasons: They raise large amounts of money with little administrative expense or burden; they are correlated somewhat with vehicle cost responsibilities; and they penalize the consumption of a commodity that some believe ought to be further discouraged. Flat or indexed volumetric charges are preferable to ad valorem charges because the latter pose serious administrative and enforcement problems, and because the price of motor fuel is not likely to vary closely with either the general rate of inflation or inflation in the highway construction sector of the economy.
>
> "Fuel tax rate increases relative to changes in other user charge rates would preserve the approximate present proportion of user charges contributed by fuel taxes if fleet fuel economy continues to improve."

Question 27 (response continued)

From a technical perspective, WHI would be inclined to accept the FHCAS conclusion to the extent quoted above. The point of contention arises from the follow-on work and stems directly from the methodology used to establish vehicular class responsibilities. It is our belief that the over/under payment situation portrayed in the FHCAS is largely a function of the methodology utilized and would be altered significantly in a bona fide Incremental or even the "Updated Incremental" solution. Should the results of these more conventional solutions be requested, as per our recommendation to the Subcommittee, we believe that an "increased fuel tax only" proposal might be judged quite acceptable with respect to an equitable distribution of costs among the user classes.

Question 28

Because of the cyclical nature of the trucking business, would not your industry be better off with a per-mile user fee rather than a lump-sum fee?

The trucking industry in the largest sense is "better off" when its highway taxes are dedicated to a fund used solely for highway purposes. Furthermore the flow of such tax revenue should be reasonably steady to support continuity in highway planning, construction and maintenance. Maximum efficiency in highway administration calls for minimum funding disruption.

Too heavy an emphasis upon vehicle use taxes would increase the magnitude of revenue decline in cyclical downturns. A balanced two-structure tax system (registration and weight fees coupled with a gallonage fuel tax) provides much better protection against cyclical dislocations in highway funding. Two-structure systems have been selected by the overwhelming majority of states. None have selected the hypothetical tax extremes (of all "lump sum" or all "per-mile user fee") posed in this theoretical question. Basically, no single tax approach can be equitable because of the great diversity of trucking industry operating characteristics. The deficiencies of the mileage tax, for example, were discussed in question #19.

The first structure is essential to a balanced system. A registration and weight fee ("lump sum") component is analogous to the standby charge, a widely-accepted element in equitable public utility pricing. The possible financial burden of this fixed component in the user tax structure is mitigated in a declining cycle by greater use of various available "installment" alternatives. The quarterly payment of the federal truck weight tax is an example. Many states offer partial year registration options. The growing vehicle lease plans and private sector financing options can also be helpful in minimizing the potential impact of fixed tax costs.

Question 29

CBO testified that under staff alternatives 1 and 3, "the likely impact on truck operations should be quite modest. Total trucking costs, including the costs of the driver and distribution costs, are likely to rise by between 1.4 and 1.8 percent." What are your estimates?

Staff alternatives 1 and 3 reflect two possible applications of the FHCAS findings as they relate to a federal highway program structured according to a projected revenue base of $12.7 billion. In each case, $11.7 billion would correlate with the FHCAS-determined cost responsibilities, and the remaining $1 billion would be allocated exclusively to some estimate of urban area travel. It is unclear from the written material whether or not the separately-identified $1 billion might actually be intended to satisfy Secretary Lewis' stated desires for additional urban transit finding.

Alternate 1 was not identified with any of the specific FHCAS revenue generation proposals. Alternate 3, on the other hand, alludes to a 4-cent-per-gallon diesel differential and to some unidentified axle-weight tax as a substitute for the existing Heavy Vehicle Use Tax.

In order to testify as they did, CBO must have obtained more advanced and definitive information than was made generally available. Because of the obvious and, undoubtedly, intentional ambiguties of the alternatives, however, no definitive answer can be given here. The structure and amount of tax proposals will differentially affect truck operations and not all truck operations are in a marketing environment that allows complete pass-through of operational cost increases. Estimates of impact would therefore have to be done on an individual-company, not industry-wide, basis once the alternatives were clarified. We do know, however, that the margin of profitability is narrow today for most truck operations and that any increase in operational costs without countervailing increases in productivity will make continued operation impossible for many of them.

Question 30

In the competition for freight traffic, the railroads' share has been declining while trucks' share has steadily climbed. How much of the freight business is rail-truck competitive and what economic impact do you foresee if taxes on the heaviest trucks are raised?

The general trend of rail freight traffic ton-miles has been upward since 1950 but rail share of market has been declining with the gains going to pipelines, trucks, and barges in that order. The reasons for these shifts are too complex to be explained by rates alone. They are heavily influenced by technology certainly. But the truck gains especially have been aided by demographic shifts, suburban settlement patterns, consumer preferences, decline in freight densities, rail abandonments, etc.

There is a "band" of competitive freight traffic for which the modes contest. It is never static and always difficult to quantify. R. D. Roth, in a presentation at the 1977 Transportation Research Board meeting, reported that only about 26.6% of all manufactured tonnage is rail-truck competitive. About half of that (13.3%) is seen as "tending to truck." If heavy truck taxes are substantially increased, some of this freight would undoubtedly move back to rail and become non-competitive, assuming little or no rail rate change.

What appears equally probably is that rail rates will move up to match truck tax cost increases so no great shift within the competitive band will occur.

However, the economic impact will not be limited to just those shipments where modal choice is price sensitive. There are many shipments outside the competitive range that will continue to move by rail but which are affected by truck rates because that is the only alternate mode the shipper has--albeit higher priced to reflect the rail/truck quality of service differences. For this type of rail freight, when truck rates go up for whatever reason (higher taxes, labor expenses, reduced productivity, etc.), rail pricing will quickly follow suit. Rail rates will rise simply because the "deregulated" market opportunity is there to maintain the service/price relationship and to maximize revenue--even though rail operating costs are totally unaffected. With these considerations in mind, the effects of significant truck tax increases may be far more pervasive in their inflationary effects upon shippers and consumers than upon the share of total freight hauled by trucks or rails.

Question 31

The railroads argue that they should carry loads of 50,000 pounds or more while the trucking industry continues to seek an increase in the Federal weight limit of 80,000 pounds. Isn't there some point at which truck weight becomes too heavy and hence a major factor in highway deterioration?

No, if the trucking industry's recommended policy on truck size and weight were accepted, truck weight would be no more a factor in highway deterioration than it is now. In fact, it could possibly become even less a factor. This is true because, as proposed, any further increases in allowable gross weight would necessarily be spread over more axles and greater length. Thus, with single axles limited to 20,000 pounds, tandems at 34,000 pounds, and gross vehicle weight (GVW) controlled by formula "B," pavement and bridge effects would not change appreciably with increases in overall gross weight. For example, under formula "B" with GVW at 105,500 pounds (as is now the case in several western states where they are operated under special authority), some of the long combinations show pavement and bridge effects per ton of freight hauled that are substantially below those of more widely authorized units.

Question 32

In the General Accounting Office's 1979 study Excessive Truck Weight: An Expensive Burden We Can No Longer Afford there was an estimate that trucks run overweight more than 20 percent of the time. What are your most recent estimates?

The selective use of figures by the GAO makes its statements on overweight trucks valueless from a research point of view. The GAO relied on a limited sampling of truck weighings, eliminated empty trucks from its calculations, and counted as "overweight" trucks which were legally operating under special permits or statutory weight exemptions. The result of this arithmetical massage bears little relation to what actually occurs on the highways.

Several states allow the operation of longer and heavier combinations under special permit. These combinations are more productive and reduce the number of trucks needed on the highway, but most important, they reduce axle loadings through application of the federal bridge formula. Yet these combinations, though legal and beneficial to the highways, were counted as "overweight" by the GAO.

Similarly, most states issue special permits or grant statutory exemptions to certain types of basically local operations. These types of operations may: (a) not have ready access to scales (e.g., movements from agricultural fields, which may be required to adjust their load at the first opportunity); (b) be of an emergency nature (e.g., certain highway construction and maintenance equipment); or (c) be impossible to bring within statutory limits (e.g., nondivisible loads). Through permit systems or statutory requirements, axle loadings can be minimized for these operations and they can be restricted to designated highways ascertained by the states as capable of handling such movements. The states, of course, then make appropriate adjustments in their construction and maintenance plans for those highways. Yet these operations, though legal, vital to local economies and controlled by the states, were counted as "overweight" by the GAO.

While WHI itself does not conduct truck weight studies, we are familiar with those of several Western states. A more complete picture of the frequency of overweight trucks has come about recently through the use of electronic weigh-in-motion scales. WIM scales can check 100% of the traffic stream for possible axle and gross weight violations, including enforcement of the bridge formula on interior axle spacings. At a meeting of the Multistate Highway Transportation Agreement committee on November 5, 1981 a representative of the Idaho Department of Law Enforcement reported that their federally-financed program of truck weight enforcement using WIM scales had shown only 1% overweight violations in Idaho for 1980, declining to 7/10ths of 1% in 1981. WIM experience in Nevada as reported by the Nevada DOT has been similar to that in Idaho. Oregon, while not using WIM equipment, routinely reports overweight violations in the range of 2-3%.

Question 33

The truck size and weight issue is before a number of State legislatures as well as Congress. What do you see at the major considerations in any proposal to raise size and weight limits?

Our nation's highways are an important tool of our economy. As with any tool, it is in our national interest to allow the most productive use of our highways within the limits of safety, compatibility among users, and protection of the highway pavements and structures. The role of federal law is to protect the federal investment in the highways and to ensure a basic flow of interstate commerce at reasonable size and weight levels. Beyond that, federal law can best serve our economy by allowing states and regional groupings of states the flexibility to meet their particular highway transport needs as long as the pavements and structures remain protected.

The federal investment in the highways can be protected through axle weight limits at 20,000 pounds single, 34,000 pounds tandem, and the control of gross weights and interior axle spacings through federal formula "B." No other standards are necessary to protect pavements and structures.

The federal law can ensure a basic flow of interstate commerce through a mandate that all states allow certain specified minimum size and weight levels, such as uniform use of the basic twin-trailer combination, on all road systems covered by the federal size and weight law.

Great potential for increased productivity exists in the use of longer and heavier combinations, as currently operated in over a dozen states. Federal law can optimize our highways' productivity by specifically allowing all states to issue special permits for the transportation of readily divisible loads as long as the axle weight limits and federal formula "B" continue to apply. States are in the best position to determine what types of combinations, what size and weight limits under permit, and which highway routes are proper to meet their particular highway transport needs. Regional transportation forums are already in place to facilitate compatible treatment of special permit operations. (Of course, an adequate "grandfather" clause is necessary to prevent economic dislocations and nondivisible loads, which by nature cannot move within axle weight or formula "B" limits, must be provided for.)

Recognition in federal law of the issuance of special permits for the transportation of readily divisible loads does not contemplate unlimited operations of all vehicles, regardless of size and weight. Rather, the goal is efficiency, economy, and safety through the use of more productive vehicles of greater length and gross weight under strict state regulations covering highway capacity, equipment, drivers, and operating practices. Our highways are a tool of the economy with untapped potential for productivity.

At this Subcommittee's field hearing on truck sizes and weights August 15, 1981 in Boise, Idaho, WHI submitted two documents that more fully develop the rationale and research behind the use of longer and heavier combinations:

Question 33 (response continued)

"Motor Vehicle Size and Weight Standards--Western Regional Objectives," a study prepared for the TRED Foundation.

"More Productive Trucks," a WHI film report on operational tests of these combinations.

We urge the Subcommittee to review these documents already in the Subcommittee files.

Question 34

The Oregon DOT has stated, "(w)e have also observed that longitudinal cracking in pavements can either be environmentally or load caused... However, without heavy wheel loads, these cracks require little or no maintenance in Oregon's climate." What is your reaction to this statement?

WHI has a long-standing and good working relationship with the Oregon DOT, yet this particular statement and the overall context in which it was made have not been referred to us for review. It is our understanding, however, that the State of Oregon includes some rather diverse extremes with respect to both environmental conditions and traffic loadings. It is not surprising, therefore, that Oregon DOT should feel well positioned to make these observations.

Oregon is also frequently found among that group of states that are recognized leaders in the area of technical research. A 1973 Oregon DOT release, Summary Report of a Long-Term Asphalt Concrete Serviceability Study bears somewhat on the statement in question and perhaps even more so on the empirical nature of the overall design process. The report states as follows (WHI emphasis added):

> "The final regression equation having significance to the project is for the pavement condition code. This code was established to express numerically the serviceability of the pavement in terms of the prevalence of cracking or patching that occurred during the study. To reiterate, the ratings go from zero for a pavement free of cracks that had received no maintenance to four for a pavement that was cracked severely or that had required patching several times at a given point. The regression equation for the overall data includes the following variables, listed in the order of importance to the correlation: years service; in-place S value of top lift; percent moisture content in stone base; wheel track depressions; percent air voids in base lift; equivalent wheel loads; ratio of 1/4" - #10 to 1/4" - 0; and penetration of the asphalt in the top lift. Each coefficient has a positive sign. That the equation relates first to years service instead of equivalent wheel loads is probably caused by the thin patches which were often placed over both the median and outer lanes even though only the outer lane may have needed maintenance at the time. Records were not detailed enough to permit adjustment of the pavement condition code for this type of case. The variables selected in the regression analysis were from among 28 possibilities and it is interesting to note those of major importance."

Of specific interest is the fact that equivalent wheel loads, though found to be an important consideration in this Oregon attempt to identify the probable causes of deterioration in pavement surface condition, could not be placed at the head of the list. Note their apparent surprise at this finding and that the probable explanation for this phenomenon is normal routine maintenance.

Question 35

Both the Arkansas and Louisiana DOT's have asked trucks to use the left lanes on certain Interstate highways. Why do you believe this request was made?

Arkansas and Louisiana are probably nearing and/or experiencing normal pavement conditions expected during the later stage of the design life of the outer lane of some of their Interstate highways. This doesn't mean that truck loads are necessarily any greater than the design anticipated; it simply suggests that the cumulative load effects are perhaps comparable to those which the design anticipated.

As indicated in our written statement to the Subcommittee, if there is a problem it may well have resulted from the empirical nature of the design process. Even though both Arkansas and Louisiana reportedly rely on the AASHTO design procedures, the interrelationships within the multitude of design parameters considered in the early pavements may have been subject to some later reorientation. It should also be noted that some of the earlier interstate pavements may not have been designed with a thicker section in the outer lane to accommodate the heavier vehicles that are normally concentrated there.

In any event, reconstruction can perhaps be postponed for a time by shifting some of the heavier loadings to the inner lane where the anticipated load effects have not yet been realized. It remains to be seen, however, what potentially significant adverse impacts this action might have on the safety and/or operating efficiency of the affected roadways.

Question 36

There has been frequent reference to the Baltimore-Washington Parkway as an example of a highway that is deteriorating despite the absence of truck traffic. AASHTO testified last month that a highway's service life is finite. Since the B-W Parkway is 22 years old, can't it be argued that it has, in fact, lasted its intended service life?

We agree. The B-W parkway reportedly lasted its probable intended service life, about 20-25 years. However, age and environment were the apparent predominant factors in its deterioration. Most of the well-designed Interstate highways with mixed traffic are performing equally as well. Age and environment, in addition to traffic loadings, should also be recognized as factors contributing to their deterioration.

The FHCAS "Recommended" approach is said to recognize and allow for environmental factors. With respect to rehabilitated pavement costs, FHCAS says: "Using the road test equations directly probably overassigns costs to heavy vehicles since it is implicitly assumed that all pavement costs are related to load by the functions that were developed without considering non-load-related deterioration. An estimate of 30 percent of these costs being not related to load causes costs to be assigned very closely to the recommended approach." Again, one of the weakest points of the entire pavement consumption approach is that there is no broad-based experiential research which correlates the service-life characteristics of pavements actually designed and built for mixed-traffic utility with that predicted by the AASHO Road Test "weight only" relationships.

Question 37

It has been said that toll roads could better match rates to actual road costs. What is your position on toll financing of highways?

A discussion of toll roads is best divided into (a) the use of toll financing to construct new facilities, and (b) the use of toll charges on existing roads to directly recover the maintenance costs of those facilities.

The use of toll financing to construct new facilities was debated nationally and in Congress both at the dawning of highway travel (pre-world War II) and before the construction of the Interstate System (late 1940's - early 1950's). Both times it was rejected at the federal level. Here are some of the reasons Congress did not favor the toll road:

1. To attract any traffic at all it must be designed to standards beyond the need of the traffic it will get. This is signalized by the relatively high charges that must be exacted for its use.

2. It must always remain an added facility incapable of dispensing with the need of alternate free facilities that must be continued in service at cost to the community.

3. It must bear the large cost of toll collection.

4. It is commonly, and almost necessarily financed with revenue bonds at interest rates inevitably higher than the rates the public would have to pay for money borrowed to create an identical free facility.

5. However great may be the remainder of traffic left to the parallel free road, however insistent may be the need for substantial improvement of the facility it affords to that traffic, the design standards of the free road must be held materially lower than those of the toll road, else the latter will be robbed of nearly all of its material support.

The reasons listed above are, by the way, a direct quote from Commissioner Thomas H. MacDonald of the U.S. Bureau of Public Roads, the forerunner of the FHWA.

Today, most major highway facilities have been completed and the emphasis has shifted to maintenance of the existing system. Toll charges have been suggested as a means of directly charging the costs of maintaining those facilities to the actual user of those roads. The theory is that highways should be paid for only by those who use them. If this theory is to be logically pursued, highway users should not be required to pay for facilities they do not use. Over-the-road commercial vehicles, for example, should not have the costs of expensive urban facilities reflected in their highway user tax rates. Those costs should shift largely to passenger cars and light trucks.

Question 37 (response continued)

The objections to such a shift would be loud and long, and not just from those vehicle classes suddenly bearing an increased tax burden. It has been a basic tenet of our highway policy that the availability of a complete network of roads is of benefit to all highway users, no matter which roads they use. The toll road theory rejects that belief. With the demise of this common support for all roads may well come resistance to public financing of highway facilities in less populated areas. Toll road users may understandably resent being taxed for public "free" roads they do not frequent.

Roads in rural areas already face difficult financing problems. The two-structure highway user tax system common to the states does a rather good job of matching tax rates to actual highway costs for travel on highways of fairly comparable design and cost, such as on most Interstate and primary highways. But this match-up breaks down on secondary and other low-level roads, such as found in rural areas. Because of low traffic volumes, the unit costs of secondary or access roads (annual highway costs computed on a vehicle-mile basis) usually exceed those of major arterial highways by a substantial margin. As The Brookings Institution said in a 1951 study:

> "Theoretically, then, the direct toll method of raising revenue for highway support could be more readily justified on the secondary or local system where the cost per vehicle mile is highest than on main roads where the outlay per vehicle mile of travel is lowest.
>
> "...By the same test the conventional system of user charges is best adapted to the financing of major arteries which are characteristically designed to fairly uniform standards, and which therefore involve a relatively small variation in cost per mile."

Experience and studies since before World War II have shown that the use of toll financing to construct new facilities is justified only in certain narrow instances where the proposed facility would provide the only access across a physical barrier (e.g., some toll bridges and tunnels, the Pennsylvania Turnpike) and immediate though costlier construction is deemed necessary. The use of toll charges on existing facilities in an effort to match costs and actual users, on the other hand, when pursued logically drains public support for secondary and local roads.

Question 38

At what point does the road damage and deterioration become so severe as to constitute a major, national problem? How large-scale are the highway infrastructure needs at present?

WHI technical research experience generally supports the contentions of the highway administrative community that road damage and deterioration are already so severe as to constitute a major national problem. This situation apparently stems from the fiscal inability of the highway agencies to fully commit the resources required to perform recognized maintenance and rehabilitation procedures in a timely, cost-effective manner. WHI would defer to other recognized authorities, however, in the matter of quantifying the precise level and extent of needs.

TESTIMONY
FOR
THE SUBCOMMITTEE ON TRANSPORTATION
OF THE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ON

COST ALLOCATION
AND
THE EFFECTS OF VEHICULAR WEIGHT LIMITS ON BRIDGE STRUCTURES

DAVID R. SCHELLING
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AUGUST 18, 1982

INTRODUCTION

The Following is a two part testimony intended for presentation to the Subcommittee on Transportation of the Committee on Environmental and Public Works on August 18, 1982. The testimony pertains to Cost Allocation Methodology and the Effects of Vehicular Weight Limits on Bridge Structures.

PART I - COST ALLOCATIONS

The Maryland highway cost allocation study was intended to evaluate the equity of current state highway user tax payments among the users of Maryland highways, roads, streets and bridge structures. The study, completed in February 1982, utilizes both the traditional incremental method and the new Federal Primary Method which parallels the national study just completed by the Federal Highway Administration. The following pertains to the status and results of the study:

1. The Maryland study encompased both the incremental and the new Federal Primary methods in order to provide policy makers with a range of options. Although a range of responsibilities was evident, this does not imply that the results associated with either method represents a bound on the actual responsibilities.
2. The Maryland study was the first to utilize the new Federal Primary method and has benifited from substantial liason with members of the FHWA (including those of the study team) the Congressional Budget Office, the Maryland State legislature and the Maryland Department of Transportation. It is felt that the methodology incorporated within the report pertaining to the new Federal Primary method yields results consistant* with that specified in the report: "Final Report on the Federal Highway Cost Allocation Study," Volumes I and II, 1982.

* Note: The Maryland Study incororates VMT weighted passenger car equivalents as an allocator which is not specified in the final version of the new Federal Primary method. However, it is believed that the results of the Maryland study could not be appreciably affected by this change.

3. The Maryland study utilized actual and projected highway expenditures over a relatively large base period of six years (1979-1984). Although the mix of relative expenditure of other states might be different from that of Maryland, it would be expected that the application of the new Federal Primary method would result in higher responsibilities for the heavier trucks than that given by the traditionally applied standard incremental method. For Maryland, the following major findings are given:

    - Automobiles currently pay their share using the incremental method, but are significantly overpaying using the federal primary method.
    - Pickups and vans currently pay almost their share using the incremental method, but overpay using the federal primary method.
    - Single unit trucks are generally shown to be overpaying using the incremental method and significantly underpaying using the federal primary method. This disparity is particularly large for the dump truck under the federal primary method.
    - Truck tractors are significantly underpaying using both methods. The degree of underpayment is much more severe under the federal primary method.

PART II - BRIDGE STRUCTURES

A. Cost Allocation of Bridge Structures

The incremental design of bridge structures is based on the difference in the construction costs for designs which result when various classes of vehicles are applied as loadings. The author has examined and has found wide variations in both the methodologies and results given in seven independently generated cost allocation studies. Although the comparison of the construction costs for bridges may be small as compared to the total costs of all highway related items, the percentage of allocatable cost for bridges often is significant when compared to the total allocatable costs. The following items pertain to the research needs for methodology pertaining to the allocation of load related costs o bridge structures:

1. The procedures utilized for the allocation of construction costs for superstructure elements through the incremental design method are highly variable and should be codified to a much greater degree.
    - The results obtained from the utilization of the representative bridge method generated within three independently conducted cost allocation studies indicated that as much as a 50% difference can occur in the cost responsibilities for the same structure types.
    - The bridge design relationship applicable to the base vehicle should be codified by AASHTO to reflect the most probable

values. (Examples of such functions are the deck thicknesses, clearance, etc., which would actually be used if a base vehicle, such as an automobile, were the maximum loading). Much controversy exists as to what values these functions should take. A codification of these functions within the AASHTO bridge design specifications would allow the results forthcoming from any cost allocation analysis better withstand the intense scrutiny which seems to accompany these efforts.

2. The cost allocation methodology for bridge structures should incorporate a fatigue damage assessment model:
   - Currently, no allocation study has properly incorporated the incremental costs of bridge structures for vehicles which exceed the design loading. For these studies no added costs were assessed for the legal or overloaded vehicle which exceeded those specified in design--usually the standard AASHTO live loadings. A cost assessment based on a prorated fatigue damage degradation for structural components would serve to account for these vehicles.
   - The incorporation of an effective computer model which could estimate the effects of fatigue degradation on bridge structures could be used both for cost allocation purposes and to set more reasonable limits on heavy trucks. A query of all the State bridge design agencies indicated that ten considered such a program to be of interest and eight considered it to be of great interest.

B. Overstress of Bridge Eelements

The overstress of structural elements that compose highway bridges generally occur under the conditions when special vehicles, made legal by the states, exceed the design loads for the bridges or when loads carried by the vehicle exceed the legal limits. These are discussed as follows:

1. The existing truck weight limits in many states have evolved over a period of years without the benefit of comprehensive analysis on the effect of these limits on bridge structures. Consequently, many special truck configurations now legally in use exceed the loading criteria specified by AASHTO for the design of bridge structures. Further, the use of the gross vehicle weight (GVW) as a criterion for overstress is extremely poor.
   - In Maryland. 1691 and 373 bridge spans could potentially be subjected to tolerable and excessive overstress, respectively, by the special legally loaded trucks.
   - Of the three trucks with the highest GVW, the lowest (the 65,000 lb. dump truck) causes the highest potential overstress, and the highest GVW (the 80,000 lb. tractor trailer) covers the lowest potential overstress.
   - An analysis of the state bridges under the single unit four axle dump truck of 73,280 lb., indicated that 1517 and 462 bridges would potentially be tolerably and excessively overstressed, respectively, if the vehicle were allowed on Maryland bridges. The vehicle is legal in many states.

2. It is suspected that much of the loadometer data collected throughout the states does not yield accurate information data concerning the actual truck GVW or axle load.
   - Truck weight data collected from undetectable FHWA weigh-in-motion equipment indicated dramatic increases in the weight of dump trucks over that given by the loadometer.
   - When the actual GVW of the dump trucks (with a legal GVW of 65,000 lbs.),were used as loadings on the Maryland bridges, the following statistics were compiled:
     1) 30% of the trucks were in excess of 70,000 lbs. which tolerably overstressed all bridge spans, excessively overstressed 500 bridge spans and brought 8 bridges to over the theoretical collapse load.
     2) 10% of the trucks were in excess of 80,000 lbs. which tolerably overstressed all spans, excessively overstressed 920 spans and brought 50 spans to over the theoretical collapse load.
     3) A few trucks (about 1%) were in excess of 90,000 lbs. which excessively overstressed almost all bridges and can bring 180 bridges to over the theoretical collapse condition.

Since Federal and State regulations are flexible with respect to the length of vehicles or combinations of vehicles, it would be in the best interest of the public, the trucking industry to provide consistent axle limits and configurational guidelines guidelines for the positioning of axles such that payloads of trucks could possibly be increased without significant overstress. Such a policy would necessitate a comprhensive structural analysis of the bridge structures now in place. This is possible with a computer analysis of the information on the bridges now resident within the states.

MARYLAND
COST ALLOCATION STUDY

Prepared for

State Highway Administration

Maryland Department of Transportation

by

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James G. Saklas, Assistant Professor

and

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February 1982

[The following has been excerpted from the above named report. The entire report has been retained in the committee files.]

EXECUTIVE SUMMARY

Background

- Highway Cost Allocation studies have been used throughout the country for many years to provide a systematic and logical basis for relating highway user tax structures to highway program costs attributable to specific classes of vehicles.
- The Maryland Highway Cost Allocation Study was undertaken because of strong interest expressed on the part of the General Assembly and the Executive Branch immediately following the 1981 Legislative session.
- The scope of the study was limited to comparing vehicle tax payments with highway program costs attributable to various classes of vehicles using a reasonable range of cost allocation methodologies.
- The purpose of the study was not to produce tax proposals, but rather to provide a technical framework against which the existing tax structure, as well as possible changes, could be evaluated.
- The schedule for the study was geared to the 1982 Legislative session. The study began in August 1981.

Basic Approach

- The Maryland Study was guided by a Policy Advisory Committee chaired by the State Highway Administrator and comprised of legislators and agency representatives. Meetings were open to observers. A mailing list was maintained for all interested parties. Two public forums were conducted at key points in the study.
- There is no single accepted highway cost allocation methodology. Results vary widely depending on the method used.
- Nationally, cost allocation emphasis on methodology is being placed on either a design base (incremental method), or an axle-load damage base (federal primary method).

- The Maryland Study, encompassed both the incremental method and the federal primary method in order to provide policy makers with a range of options.

- An improved method for allocating bridge costs incrementally was developed by the University of Maryland, and is being considered for use in other states.

- Average annual costs used for allocation were for the base period 1979-1984, encompassing three prior years during which actual highway expenditures were known and three future years (including the current and budget years).

- Motor vehicle tax payments were based on 1981 registrations, travel and vehicle characteristics.

- Only the State portion of costs and highway user payments are addressed, since the State of Maryland has no control over federal revenues and programs which vary substantially and have distorting effects.

Major Findings Based upon the State Highway System Only (See Table 1 & Figure 1)

- Automobiles currently pay their share using the incremental method, but are significantly overpaying using the federal primary method.

- Pickups and vans currently pay almost their share using the incremental method, but overpay using the federal primary method.

- Single unit trucks are generally shown to be overpaying using the incremental method and significantly underpaying using the federal primary method. This disparity is particularly large for the dump truck under the federal primary method.

- Truck tractors are significantly underpaying using both methods. The degree of underpayment is much more severe under the federal primary method.

Table 1

COMPARISON of PERCENT STATE USER PAYMENTS and RESPONSIBILITIES
STATE HIGHWAY SYSTEM
1979-1984

VEHICLE TYPE GROSS REGISTERED WEIGHT (POUNDS)	PERCENT OF STATE USER TAX PAYMENTS	PERCENT OF RESPONSIBILITY		RATIO OF PERCENT REVENUES/RESPONSIBILITY	
		INCREMENTAL	FEDERAL PRIMARY	INCREMENTAL	FEDERAL PRIMARY
Automobiles	67.39	67.19	57.36	1.00	1.17
Buses	0.89	0.81	1.13	1.10	0.79
Pickups/Vans (Less than 10,000)	13.49	13.26	12.05	1.02	1.12
SINGLE UNIT TRUCKS (Class E)					
10,000 - 18,000	3.15	3.23	3.35	0.98	0.94
18,001 - 26,000	1.57	1.42	1.71	1.11	0.92
26,001 - 38,000	2.25	1.95	3.22	1.15	0.70
38,001 - 60,000	0.92	0.73	1.17	1.26	0.79
SUB-TOTAL SINGLE UNITS	7.89	7.33	9.45	1.08	0.83
Dump Trucks - 40,000	0.23	0.15	0.38	1.53	0.61
Dump Trucks - 65,000	1.86	1.33	3.31	1.40	0.56
TOTAL SINGLE UNITS	9.98	8.81	13.14	1.13	0.76
TRUCK TRACTORS (Class F)					
40,000 - 60,000	2.50	2.89	4.67	0.87	0.54
60,001 - 76,000	2.26	2.49	4.11	0.91	0.55
76,001 - 79,000	3.49	4.55	7.56	0.77	0.46
TOTAL TRUCK TRACTORS	8.25	9.93	16.32	0.83	0.51
TOTAL ALL VEHICLES	100.00	100.00	100.00		

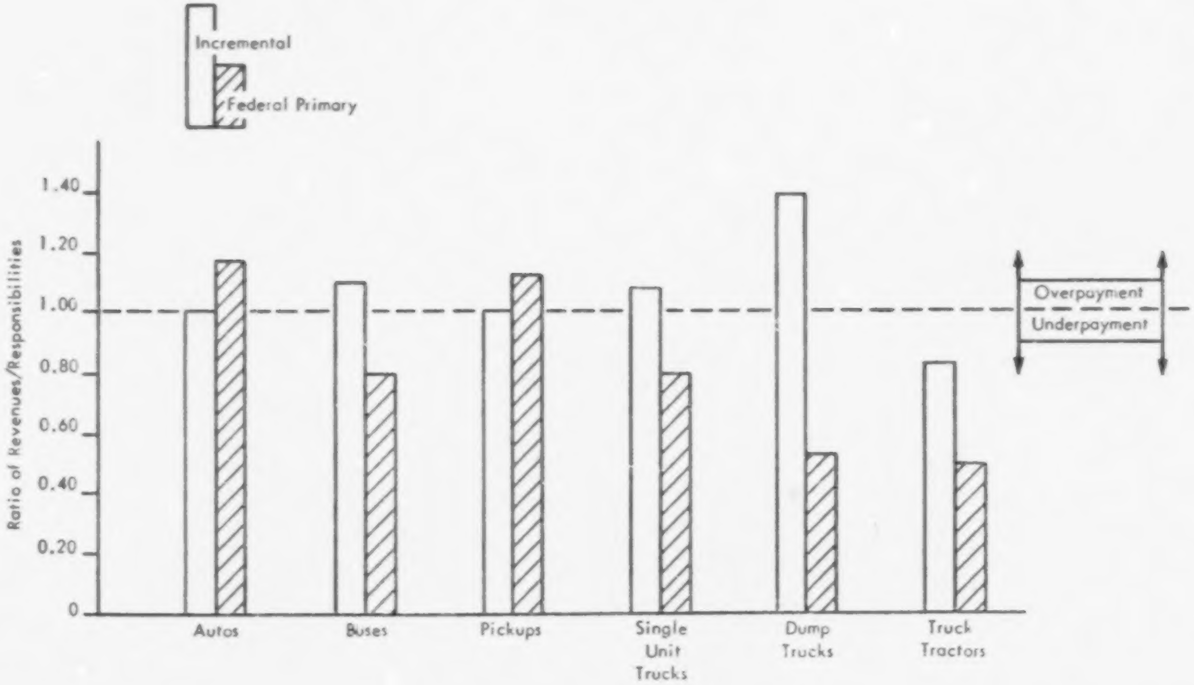
NOTE A ratio of 1.00 indicates equity in user tax payments (payments equals responsibility).
A ratio of less than 1.00 indicates an underpayment of user taxes.

Figure 1

COMPARISON OF PERCENT USER PAYMENTS AND RESPONSIBILITIES

STATE HIGHWAY SYSTEM

1979-1984



FINDINGS

The primary focus of this study was to evaluate the equity of current highway user tax payments in relation to their responsibilities as highway users.

Allocated Costs and User Tax Payments

Actual and estimated costs for the 6-year period 1979-1984 were the basis for cost responsibility allocations. Only those costs funded from state highway user revenues have been used to calculate motor vehicle responsibilities since the study addressed only the equity of state highway user payments.

Table 2 presents the results of the two cost allocation methodologies separately for two systems: (1) all highway, road and street systems, and (2) the state highway system only. The results of each analysis is expressed as a percent of the total user responsibility for each vehicle type and gross registered weight group.

State highway user tax payments are also shown in Table 2 as a percent of the total state user tax payments.

Equity of Current Vehicle User Payments

The equity of current motor vehicle user tax payments can be readily assessed by comparing the percent responsibility for any vehicle type and weight group with the corresponding percent user tax payment as shown in Table 2. For example, all single unit trucks are paying 9.98 percent of total user payments and their corresponding responsibility for state highway system costs is 8.81 percent from the incremental allocation and 13.14 percent from the federal primary allocation. Thus, on the basis of the incremental results, all single unit trucks are paying a higher percent of user taxes than their responsibility. However, when the results of the federal primary allocation are compared, single unit trucks are shown to be paying less than their responsibility.

Truck tractor responsibilities for state highway system costs shown in Table 2 indicates that all gross registered weight groups are underpaying their user responsibilities--for both the incremental and federal primary methodology. Percent of total state user tax payments are 8.25 percent, compared to total truck tractor responsibilities of 9.93 and 16.32 percent respectively for the incremental and federal primary methods.

Table 2
PERCENT of TOTAL RESPONSIBILITY and USER TAX PAYMENTS

VEHICLE TYPE GROSS REGISTERED WEIGHT	PERCENT OF TOTAL USER RESPONSIBILITY				PERCENT OF TOTAL STATE USER TAX PAYMENT
	ALL SYSTEMS		STATE HIGHWAY SYSTEM		
	INCREMENTAL	FEDERAL PRIMARY METHOD	INCREMENTAL	FEDERAL PRIMARY METHOD	
Automobiles	71.26	61.56	67.19	57.36	67.39
Buses	1.06	2.31	0.81	1.13	0.89
Pickups/Vans (Less Than 10,000)	12.16	11.19	13.26	12.05	13.49
Single Unit Trucks (Class E)					
10,000	1.42	1.39	1.56	1.59	1.47
14,000	0.15	0.15	0.17	0.17	0.16
18,000	1.36	1.46	1.50	1.59	1.52
22,000	0.45	0.56	0.50	0.57	0.56
26,000	0.82	1.11	0.92	1.14	1.01
30,000	0.34	0.58	0.38	0.53	0.38
34,000	0.96	1.63	1.10	1.79	1.31
38,000	0.42	0.90	0.47	0.90	0.56
42,000	0.05	0.08	0.06	0.09	0.08
46,000	0.11	0.17	0.13	0.20	0.17
50,000	0.04	0.06	0.04	0.06	0.06
54,000	0.02	0.04	0.03	0.05	0.03
56,000 & Greater	0.39	0.69	0.47	0.77	0.58
SubTotal Single Units	6.53	8.82	7.33	9.45	7.89
Dump Truck-40,000	0.14	0.40	0.15	0.38	0.23
Dump Truck-65,000	1.13	3.03	1.33	3.31	1.86
TOTAL SINGLE UNIT	7.80	12.25	8.81	13.14	9.98
Truck Tractors (Class F)					
40,000	0.15	0.25	0.19	0.22	0.16
44,000	-	0.01	0.01	0.01	-
48,000	0.02	0.03	0.02	0.04	0.01
52,000	0.33	0.57	0.40	0.65	0.33
56,000	0.13	0.25	0.15	0.27	0.12
60,000	0.09	0.16	0.12	0.19	0.11
64,000	0.05	0.08	0.06	0.10	0.06
68,000	1.63	2.95	1.94	3.19	1.71
72,000	0.04	0.08	0.05	0.08	0.04
76,000	2.04	3.58	2.44	4.03	2.22
79,000	3.24	4.73	4.55	7.54	3.49
TOTAL TRUCK TRACTORS	7.72	12.69	9.93	16.32	8.25
TOTAL ALL VEHICLES	100.00	100.00	100.00	100.00	100.00

Based on the results of this study, current highway user taxes paid in Maryland are not equitable among all vehicle classes and gross registered weight groups. The results of either methodology indicates a disparity between user payments and user responsibilities.

The results of Maryland's study were compared with eight other state highway cost allocation studies as shown in Table 3. Responsibilities for tractor-semitrailer combinations range from a low of 6 percent (Maine) to 27 percent for Georgia. Results for Maryland combination vehicles are 10 and 16 percent for the two separate methodologies.

The findings presented in this report provide a basis for making adjustments in current highway user tax rates and highway user tax sources.

Table 3

COMPARISON of MARYLAND RESULTS with OTHER STATE STUDIES

STATE (YEAR)		PERCENT OF TOTAL USER RESPONSIBILITY		
		AUTOMOBILES PICKUPS/VANS	SINGLE UNIT TRUCKS	COMBINATIONS
California	(1976)	67	33	
Florida	(1979)	77	6	16
Georgia	(1979)	63	9	27
Maine	(1964)	85	9	6
Mississippi	(1970)	61	39	
Oregon	(1974)	66	34	
Oregon	(1980)	55	45	
Virginia	(1981-Interstate & Primary)	62	12	26
Virginia	(1981-All Systems)	71	13	16
Maryland Incremental	(1982-State System)	80	10	10
Federal Primary		70	14	16
1981 Maryland User Payments		81	11	8

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30 September 1982

Honorable S.D. Symms
Chairman, Subcommittee on Transportation
United States Senate
Committee on Environment & Public Works
Washington, D.C. 20510

Dear Senator Symms:

Thank you for your letter of 16 September 1982 regarding my recent Senate testimony before your subcommittee on the highway program needs, revenues and cost allocation issues. I have attempted to answer your list of questions that you provided to the best of my ability. My replies are on the attachment to this letter.

If you will permit, I would like to take this opportunity to provide my general opinion on the entire highway issue and the problems with our highway transportation system that we, as a country, face. Perhaps you, as one of our country's political leaders, can assist in what I perceive as an important problem that should be addressed.

In general, almost every one of the questions you asked in your letter to me (and others that I'm sure you seek answers to) could be accurately answered directly by the states if they were required to have a nationally uniform Pavement Management System (i.e., a systematic approach to the periodic collection of performance data on our highway network) operational as soon as possible.

It is my own personal opinion that one of the biggest problems we have had in our highway industry to date is that we presently go through a cycle of events I call the "plan-design-construct-forget-maintain-rehabilitation" cycle or sequence. If we are ever to make the most efficient utilization of our limited economic resources, we must move to replace the "forget" link with a "feedback" (performance data collection) system.

Until this is accomplished, on a well-thought out and planned national scale, it is my opinion that many of the most significant problems that you and the country seek answers to will never be conclusively determined. When one stops and realizes what an enormous financial investment the U.S. has in its current highway/road/street network, it can only be concluded that it is both a lack of foresight and extremely poor business posture that we do not have a uniform, systematic pavement management program to monitor this investment and make sound decisions based upon the future national economic implications of our actions.

I can only suggest strongly that you do all possible to encourage the federal government to initiate steps to insure that this is eventually accomplished. While I recognize that the pursuit of a national or federal policy on this runs against the current feeling and attitude of allowing individual states more power or self-autonomy in self-government, the lack of a uniform national approach to this program will effectively eliminate our ability to truly assess impacts of such significant variables as environment and materials upon their role in the performance and economics of our highway network.

Again, I would sincerely like to thank you for your invitation to appear before your subcommittee. It was a rare privilege that I will, personally, never forget.

Thank you for your time and consideration in this matter.

Sincerely,

M. W. Witczak
Dr. M.W. Witczak
Professor & Chairman,
Civil Engineering Department

MWW:cml
Enclosure

FOLLOW-UP QUESTIONS FOR DR. MATTHEW WITCZAK

1. Is the data contained in the AASHO Road Test relevant to today's highway needs and does it provide a current basis for a study of highway cost allocation and needs?

2. Do you believe the AASHTO "Interim Guide for the Design of Pavement Structures" needs to be updated? Are the pavement thickness guidelines adequate for current traffic volumes and weights?

3. What is your opinion of the Highway Cost Allocation Study recently completed by the U.S. DOT? How valid are the study's assumptions, methodological approaches, and findings?

4. The 1962 AASHO Road Test found that a fully loaded tractor-trailer/semi combination does the same amount of pavement damage as it takes 9,600 cars to cause. The recent Federal study uses a ratio of 1:18; do you believe this is a conservative estimate?

5. The latest Federal cost allocation study uses a cost occasioned method. What advantages or disadvantages does that methodology have compared to the incremental method used in the 1960's?

6. Staff alternative 3 proposes a graduated axle weight on heavy vehicles. This proposal would permit better assignment of cost responsibilities to individual users but would be difficult to administer. What are your views on this proposal?

7. Have you seen two reports prepared for the American Trucking Associations - Causes of Pavement Damage on Interstate Highways, done by CounselTrans, Inc., and the Effects of Truck Weights on Pavement Deterioration by the Texas Transportation Institute? If so, what is your opinion of the analyses?

8. AASHTO reviewed the two ATA studies mentioned above. In its review, AASHTO says that both reports failed to point out that loads and environmental factors interact to cause pavement distress, and that this interaction has long been recognized by highway engineers. Do you agree with the AASHTO analysis?

9. In the AASHTO analysis of one of the above ATA studies, AASHTO states, "Non-load distresses such as joint spalling will indeed occur regardless of traffic loading. But once stress is relieved by cracking, the distress will stabilize unless acted on by traffic. Thus, while the initial stages can be classified as non-load, increases in severity most often are associated with loads." Do you agree with this statement?

10. The CounselTrans report done for ATA concludes that there is no measurable effect of different maximum axle loads on pavement deterioration. Do you agree with this statement?

11. ATA stated in its Washington testimony, "(a) growing body of evidence reveals that equivalent single axle loads are very poor predictors of pavement performance (or damage) and particularly so for adequately designed pavements." Would you agree?

12. ATA says that the Federal Highway Administration has double counted costs by "charging heavy vehicles for the cost of building extra pavement strength to accomodate them and then charging again on an escalating differential basis for the use of the pavement." In your reading of the DOT study do you find that double counting has occurred?

13. To what extent must heavy vehicle axle loadings and gross vehicle weights be taken into consideration in designing a bridge? What effect will heavier axle loadings or gross weights have on existing bridges?

14. What do you believe are the major causes of bridge deterioration?

15. How much of pavement wear is due solely to environmental conditions and how much seems to be an axle-load/environment interactive process?

Dr. M.W. Witczak
Replies to Follow - Up Questions
30 September 1982

1. In general, I believe that the data obtained from the AASHO Road Test is still relevant to today's highway needs. In addition to the results of this Road Test, it must also be recognized that the states have also had 20 years experience to modify the fundamental concepts of the Road Test for their own conditions. Thus, the major limitations of the Road Test (namely, the presence of only one subgrade foundation and exposure to a unique environment) have been fairly accurately incorporated into current state AASHO design utilization. Because of this, I feel that it does provide a current basis for study of highway cost allocation and needs. This is particularly true when one recognizes that one of the more significant substudies of the Test Road dealt with the influence of varying axle type/loads upon pavement performance.

2. Yes, I believe that the AASHTO "Interim Guide for the Design of Pavement Structures" should be updated. However, I say this not because the findings of the Road Test are not applicable to today's conditions. Rather, revisions are necessary to incorporate a more accurate assessment of the numerous material types that are used today compared to the rather limited range of materials from which the AASHTO Road Test utilized. In the last 20 years, there has been also significant advances in designing for different pavement distress mechanisms that could also be introduced into a revised "Interim Guide". I believe that pavement thickness guidelines are adequate for present traffic volumes and weights. The mathematical form of expressing pavement thickness to traffic established from the AASHO Road Test is convenient to extrapolate data (fairly accurately) from the 1,000,000 plus AASHO repetitions to up to 50,000,000 or so repetitions. Unless there are future significant changes in increasing the maximum axle loads permitted in the states, I feel that this adequately represents an upper limit of design traffic that the U.S. would encounter in the most unfavorable design situation.

3. My personal opinion of the recently completed U.S.D.O.T. Highway Cost Allocation Study is that it represents the fairest assessment of allocated costs currently possible with the present day state-of-the-art of pavement performance.

4. The recent Federal study which uses an equivalent damage ratio (fully loaded tractor-trailer/semi combination to a passenger car) of 1:18 is, in my opinion, very conservative. As a general rule, most countries throughout the world use the well known "fourth power" rule as a fairly accurate estimate of vehicle damage factors (i.e., the ratio of the load of the vehicle in question (passenger car) to the load of the standard vehicle (18 KSAL) raised to the power "4" represents the damage factor). The results of the original AASHO Road Test probably come closer to the real damage factor than the 1:18 ratio used in the recent Federal study.

5. This is obviously a difficult question to answer directly. If one is given the choice of whether the cost occasioned method or incremental method is the best, I would say the cost occasioned approach is best because it directly accounts for the relative contributions of varying axle loads upon construction and damage (maintenance) to the highway system.

6. I am not familiar with the details of staff alternative No. 3. However, if my interpretation of the comment contained in question No. 6 is that assignment of cost responsibilities would be directly related to axle loads, I would definitely agree that such a proposal would be nearly impossible to administer.

7. I have had the opportunity to review both of the noted reports, ("Causes of Pavement Damage on Interstate Highways" and "Effects of Truck Weights on Pavement Deterioration"). I strongly disagree with the findings and analysis of these studies.

8. I concur 100% with the AASHTO findings of the two ATA study reviews. In fact, this is my main reason for the answer to question No. 7.

9. In general, I would agree with this AASHTO statement. If anything, I would even question that the initiation of joint spalling is completely independent of load.

10. I unequivocably disagree with the CounselTrans conclusion that there is no measurable effect of different axle loads on pavement deterioration. If this is indeed a true statement, then every piece of research knowledge we have gained in over 40 years of structural design of pavement systems is worthless.

11. Never.

12. It is true that the Federal Highway Administration's approach "charge heavy vehicles for the cost of building extra pavement strength to accommodate them and then charges again for the use of the pavement". However, I do not view this as double charging but rather the allocation of costs for each cost component (Initial Cost and Maintenance cost). In fact, we could even argue that User related costs should also be a third allocated cost component based upon vehicle load.

For example, it is a well documented fact that increased road roughness (due to heavy vehicles) results in increased vehicle operating costs, decreased gas mileage, etc. In the present allocation scheme, passenger car users are directly assessed this economic penalty that is primarily due to heavier vehicle loads.

13. I do not feel qualified as an expert in bridge design/performance to answer this question.

14. I do not feel qualified as an expert in bridge design/performance to answer this question.

15. My best educated estimate to this question is that a maximum of 5% to 10% of pavement deterioration is due solely to pure environmental conditions.

HIGHWAY NEEDS VERSUS HIGHWAY REVENUES
The Changing Federal Role

Testimony Prepared for
the Transportation Subcommittee
of the Committee on Environment and Public Works
United States Senate
August 18, 1982

Ronald Kirby and Kiran Bhatt
The Urban Institute
Washington, D.C.

Mr Chairman:

We greatly appreciate the opportunity to testify before you in this series of hearings on the highway program. We believe that the issues outlined in your letter of invitation demonstrate that a major rethinking and restructuring of federal highway programs will be required to meet the needs of the 1980s and beyond. The likely development over the next year of new legislation for financing these programs provides a rare opportunity to address concerns which have been evolving for almost three decades.

The Congress is currently considering several alternative proposals for increasing the revenues flowing into the Highway Trust Fund, and for disbursing these funds through various federal highway and mass transportation programs. These deliberations are taking place at a time when the major concerns about the nation's highway and mass transportation systems contrast sharply with those which prompted the creation of the Highway Trust Fund in 1956:

- Only five percent of the mileage of the Interstate Highway System remains to be built, and the worth of completing some of the remaining portions is being questioned.
- Portions of the Interstate System are reaching the end of their design lives, and will require major repairs over the next ten years.
- Portions of the primary, secondary, and urban road systems face growing repair needs, as do many of the bridges in these systems.
- All levels of government are faced with the twin pressures of escalation in highway construction and repair costs and declines in receipts from motor fuels taxes.
- Tight government budgets are reducing the amounts of general revenues available for supporting the nation's mass transportation systems.

Under these new conditions, a program designed initially to stimulate the construction of 41,000 miles of interstate highways cannot continue to be a good basis for federal policy and programming. Considering the profound changes in the nation's highway needs over the last three decades, it is little wonder that a consensus is building for substantial changes in the federal role in highway financing. In the following testimony we present our views on the major issues presented by the current relationships between highway needs and highway revenues.

THE CONDITION OF THE FEDERAL-AID HIGHWAY SYSTEM

Recent popular press reports and statements by highway officials have suggested that the nation's entire federal-aid highway system has deteriorated to an alarmingly poor state. These accounts are largely anecdotal, however, and are often based solely on subjective assessments. It may well be that we are comparing current conditions against expectations derived from an era of massive road building encouraged by heavy federal capital incentives. Even where there has been noticeable deterioration, it is not always clear what level of rehabilitation can be economically justified. We believe the evidence suggests that severe problems of deterioration are confined to particular locations and types of roads. In fact, the problems appear to be most serious for the secondary and non-federally aided road systems. These were somewhat neglected over the past 25 years as local funds were diverted to federal aid systems by matching federal dollars covering up to 90 percent of capital expenditures. Greater effort needs to be devoted to determining the nature and location of the deterioration in the highway system, and more careful economic evaluation of benefits and costs needs to be carried out to identify the most worthy rehabilitation projects.

The differences in road conditions across locations and road types exist because of differences in usage, design standards, periodic maintenance practices, and weather. It should be emphasized, however, that deterioration of roads is caused largely by usage alone. The other factors do not cause any significant deterioration per se, but they do determine to a significant degree the rate at which usage affects service life.

THE NEEDS OF THE FEDERAL-AID HIGHWAY SYSTEM

In assessing the needs of the federal-aid system we must first raise the question of the appropriate federal financing role in the highway sector. A recent report by the Congressional Budget Office lays out several options, ranging from continuation of the existing federal role to elimination of many of the unfinished Interstate segments and transferral of federal-aid secondary and urban road responsibilities to state and local governments.

In the past, the federal government has provided strong inducements for over capitalization in the road network with excessively generous 90 percent and 70 percent funding accompanied by high design standards. As a result, maintenance has been neglected, and state and local efforts have focussed on expansion of the federal-aid system. While there may well have been a need for this type of federal role to stimulate construction of a high-quality national road network, the picture has now changed. The nation's trunk roads are essentially completed, and the focus must now shift to maintaining the existing system and adding capacity on just a few segments. Consequently, there is a need for a redefinition of the federal interest. In our view , the Reagan Administration's proposals move in the right direction by dropping from the federal responsibility the secondary and urban systems, as well as non-essential segments of the Interstate system. In focusing on the existing Interstate and primary systems only, the proposal would significantly reduce the federal role in highway financing.

The level of federal revenues needed is obviously a function of the level of federal responsibilities. Thus, if consideration is given to a reduced federal role (as in several options suggested by the Congressional Budget Office), overall revenue needs may be lower than those currently under consideration. Such a situation would mean smaller increases in federal user fees.

We believe the Congress should begin to move in this direction as soon as possible. Alternatively, the user fee increases enacted now should have a sunset provision pending review of the federal role, or provision for a turnback of revenues to states and local governments along with some road financing responsibilities.

ALLOCATION OF HIGHWAY COSTS AMONG THE VARIOUS USER CLASSES

It is important to distinguish between two types of road expenditures: occasioned costs and common costs. Occasioned costs are those that are clearly caused by road use by a particular vehicle or vehicle class. They can be avoided if that particular vehicle or vehicle class does not use the roads. Examples include the cost of rehabilitating pavements and of installing truck weighing stations. Occasioned costs can be allocated to particular vehicles or vehicle classes in accordance with defensible engineering and economic methods. For any particular road, no more than 50 percent of total highway costs are occasioned costs.

Common costs are those costs that cannot be attributed to any particular vehicle or vehicle class. In contrast to occasioned costs, common costs cannot be allocated unambiguously among vehicles or vehicle classes using engineering or economic methods. Consequently, the allocation of common costs must be viewed largely as a process to be resolved in the political arena. One popular, albeit arbitrary, method is to allocate common costs in proportion to vehicle miles traveled. This puts almost all the common cost burden on automobiles. There are other, seemingly more efficient and no less equitable methods available such as the use of ton-miles or value of service to allocate common costs. A report prepared by The Urban Institute in 1977 concluded that the most beneficial policy from a societal standpoint would be to allocate common costs so as to least disrupt existing traffic.

In our view, the most recent Federal Highway Cost Allocation Study does a creditable job of estimating costs occasioned by different classes of vehicles. On the other hand, we have major reservations about its treatment of common costs. While acknowledging the arbitrary nature of common cost allocations, the report considers only one common cost allocation method--that based on vehicle miles. From the standpoint of economic benefits to society, this is possibly the worst starting point for developing road user charges. Furthermore, it does not make any compelling contribution to promoting equity in road user charges. The common cost allocation decision should have been made in the political arena, after evaluation of the impacts of several alternatives in addition to vehicle miles.

A PROPOSAL TO CHANGE THE STRUCTURE OF USER FEES

The pursuit of both equity among users and maximum benefits from road use dictates more emphasis on and direct reflection of occasioned costs in highway user fees. In this regard, neither the alternatives recommended by the Federal Highway Cost Allocation Study nor the three alternatives suggested in the attachment to Senator Symms' letter of invitation are especially appealing. These alternatives bring some improvement in the current structure of user fees in terms of equity among principal vehicle classes. However, we can and must do better if we are to pursue greater productivity in the highway sector as well as equity among road users. Of course, getting from where we are to where we should be may take some time, and will require greater cooperation between the federal, state, and local governments in setting user charge policies. To this end, we believe that the federal user fee policy can set the tone and demonstrate leadership.

Our proposal for user fees calls for a two level approach to move toward greater productivity and equity. We propose occasioned cost pricing using a weight-mile tax as the first tier tax. Since this tax will not generate sufficient revenues to meet total expenditures, there will be a need for a second tier tax to raise the residual amount required. We propose that this sum should be raised from each vehicle class in a manner which minimizes benefit losses due to shifts in usage.

A weight-mile tax would be characterized by a graduated rate (cents per mile) based on the weight of the vehicle. A precise fee-structure that would minimize inequities and maximize productivity would require special sensors on heavy vehicles to monitor axle-load-miles driven. Such sensors have been used in special applications on logging roads in the U.S. and more generally in parts of Europe, and could be available at reasonable costs in the near future for large-scale applications in the U.S. In the meantime, federal policy could begin to follow the lead taken by more than half a dozen states by introducing a simple and easily administered version of the weight-distance tax. Instead of continually monitoring axle-load-miles for each vehicle, the states collect periodic data about the mileage driven by each vehicle along with its particular gross weight or axle weight designation. The weight-mile tax is then imposed on the gross-weight-miles driven. Administrative costs and evasion reportedly have been kept low by these states.

For a national level tax, detailed vehicle mileage records would be necessary. Most states already collect such data either for allocating diesel fuel tax revenues among neighboring states, or through multi-state vehicle registration plans (such as the International Registration Plan) used to share truck registration fees in proportion to the mileage accumulated in each state. An administratively attractive option might be to have the states collect these taxes on behalf of the federal government.

An axle-weight-mile tax would be preferable to a gross-weight-mile tax because while both would discourage heavy loading and thus prolong road life and reduce costs, the former would do it more effectively. Further, the axle-weight-mile tax would permit heavier gross weights at reasonable fee levels when the weight is distributed over a number of axles. In the long run, such a tax would encourage the incorporation of less damaging axle configurations on vehicles. In the absence of continuously monitoring sensors, approximate weight-mile taxes would provide a major first step in the right direction.

Since the weight-mile taxes we have discussed will generate only part of the revenues required to cover highway expenditures, additional user taxes will have to be imposed. In order to minimize the benefit losses resulting from these taxes, we recommend that the Congress consider allocation procedures which come closer than the vehicle-mile scheme to approximating value of service. Moving in the direction of a ton-mile scheme would achieve this objective, for example. These additional revenues can be raised through any convenient tax instruments, such as gasoline taxes and/or annual user fees. Once these taxes were applied to make up the required revenues, we believe there would be little justification for gasoline/diesel differentials or special exemptions. We would also recommend elimination of the other excise taxes, such as those on tires and tubes, so as to keep the fee structure as simple as possible.

The recent Federal Highway Cost Allocation Study points out that efforts to design federal user charges to promote efficient road use could be thwarted by state and local user charges which "bear little relationship to efficient charges". For this and for administrative reasons, we believe that efforts should be made to promote greater coordination of user charge policies between the federal, state, and local levels of government. In general, all of these levels of government appear to have the same objective: to raise sufficient revenues from road users to cover highway expenditures while promoting maximum productivity and equity among users. A combined road user tax based on the principles discused above, collected by the states, and allocated to the various levels of government according to their financing responsibilities would appear to meet federal, state, and local objectives. Of course, the federal government would have to take the lead in the development of such a scheme.

Combining the road user taxes of the various levels of government would facilitate the rationalization of governmental financing responsibilities. If the federal government is to move gradually toward limiting its responsibility to the Interstate and primary systems, the total revenues it collects and disburses will have to be adjusted accordingly. These totals could be determined on the basis of observed usage of the federal portions of the system, rather than through the present somewhat arbitrary tax on users of all portions of the road system. Such an approach would tie revenues more closely to use of individual road types, and give more reliable signals concerning the value of particular proposals for rehabilitation or expansion.

Secretary of Transportation Drew Lewis has proposed earmarking one cent of a five-cent equivalent increase in the federal gasoline tax for urban mass transportation. The growing financial problems of the nation's mass transportation systems have created a broad constituency for the continuation of financial assistance from the federal government. Since a strong case can be made that the revenues raised from road users do not adequately reflect the social costs of the noise, air pollution, energy use, and congestion associated with road use, earmarking a portion of the revenue from road user taxes is as reasonable a method as any for raising funds for federal mass transportation assistance.

The earmarking of new road user taxes for urban mass transportation should be accompanied, we believe, by a restructuring of the federal mass transportation assistance program. Continuation of a largely discretionary program of capital assistance with a high federal share will promote the same kinds of overcapitalization and inadequate maintenance practices that have been experienced in the highway sector. A recent report by the Oversight Subcommittee of the House Committee on Public Works and Transportation provides an excellent analysis of the federal mass transportation program and well-designed recommendations for change. Adoption of these recommendations along with increased funding from highway user fees would make a major contribution to rationalizing the rôle of the federal government in mass transportation.

CONCLUDING COMMENTS

Our suggestions for revisions to the federal highway program involve much more far-reaching changes than the major alternatives presently before this Subcommittee. While these latter alternatives would provide the revenues to respond to currently perceived financing needs, we believe that they fail to provide the basic restructuring of highway financing required by current highway conditions. Nothing less than a prompt and major rethinking of the level and structure of federal highway financing will suffice if we are to achieve the highway program we need for the next two or three decades.

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STATEMENT OF

NORMAN R. SHERLOCK

PRESIDENT

AND

CHIEF EXECUTIVE OFFICER

AMERICAN BUS ASSOCIATION

TO THE

SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

SUBCOMMITTEE ON TRANSPORTATION

"Highway Program Needs, Revenues, and Cost Allocation Issues"

SEPTEMBER 1, 1982

American Bus Association
1025 Connecticut Avenue, N. W.
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(202) 293-5890

Mr. Chairman:

On behalf of the American Bus Association (ABA), I wish to thank you for this opportunity to submit comments on pending highway cost allocation issues.

The American Bus Association is the national trade association for the intercity bus industry. Our members include almost 700 bus operators, 110 manufacturers, suppliers, and consulting engineers, and some 1,600 members engaged in travel and tourism -- theme parks, attractions, cities, states, restaurants, hotels, and motels.

The intercity bus industry currently provides scheduled service to 15,000 U. S. communities, 14,000 of which have no other form of public transportation. Last year, the industry carried 375 million passengers.

The American Bus Association and its members have consistently recognized the need for adequate funding for the nation's highway system as well as safety programs which protect the public. The interstate highway system is the basic infrastructure which supports transportation services, the pervasive travel and tourism industry, and many other businesses. There is an overriding public benefit in the proper construction and maintenance and funding of a good highway system. People throughout the country benefit directly and indirectly from it, whether they travel on it or not. For this reason, any highway cost allocation study must take into consideration many diverse factors.

We are pleased that the Final Report on the Federal Highway Cost Allocation Study did not recommend repeal of all user fee exemptions. It is our belief that the repeal of excise tax exemptions enacted by Congress in 1978 would seriously affect the intercity bus industry and would be contrary to the best interests of the industry and the traveling public.

In 1978, the Congress repealed the 4-cents a gallon tax on diesel fuel and other excise taxes for bus operators engaged in scheduled and local service, charters, and special operations. This was done as part of the nation's continuing efforts to conserve fuel and to help assure the continued viability of the intercity bus industry as a practical alternative to private automobile use. The Senate Finance Committee, in its report to the Energy Tax Act of 1978 (P.L. 95-618), cogently stated the case for repeal when it said:

> The Committee considers it desirable to encourage the use of bus transportation because it is a more energy-efficient mode of transportation than use of private automobiles. In addition, the Committee believes that the tax distinctions between local transit buses and intercity buses, (scheduled and charter) should be removed, as both types of bus transportation conserve energy as compared with private auto transportation.

During hearings on the Cost Allocation Study at the Federal Highway Administration (FHWA) not long ago, the question was raised about the prospect of ending the exemptions for intercity bus operators and replacing them with a direct subsidy program. The idea that the use of subsidies can and will make up for the loss of these tax exemptions is not sound. The Congress, at the suggestion of the Department of Transportation, is not planning to reauthorize the only direct subsidy program for private bus operators that existed, ending any possibility of direct federal or federal/state subsidies. In fact, even though the Congress had authorized the subsidy program for rural services in 1978, it was never funded. It is now clear that there is no prospect for a program of direct federal subsidy to private bus operators to maintain rural service or develop terminals. Since the Administration is not willing to support these subsidy programs, the only hope held out for us at this point is that the Administration and the Department of Transportation will at least not seek to impose new tax burdens on the industry. Given the existing revenue problem of the states and the likely priorities they would place on such a need in relation to other programs, as well as the mood of taxpayers today, it is not realistic to expect that states will be able and willing to provide subsidies to bus operators to offset a new tax burden.

The reimposition of these federal excise taxes would seriously affect our ability to serve the travel and tourism industry, which now relies on bus transportation and which will do so increasingly in the future. Travel and tourism rank first or among the top three activities in terms of economic importance in just about every state. It is the nation's second largest industry, contributing about $191 billion annually to the gross national product and accounts for more than four percent of non-agricultural employment. Bus service has been recognized as a critical lifeline for this activity.

The repeal of the intercity bus exemption would be inconsistent with sound energy and transportation policy and would, in fact, act as a disincentive to wide-spread use of public transportation systems. One of the most attractive aspects of intercity transportation by bus is its relatively low cost. As gasoline and diesel fuel prices rise, the traveling public is increasingly aware of the disparity of cost between a trip by private automobile and a trip by intercity bus. The repeal of the excise tax exemptions would force intercity bus operators to pass on the increased cost to consumers and would, therefore, appreciably lessen the economic disparity between travel by intercity bus and travel by private automobile. The effect of reimposing the federal excise taxes on the intercity bus industry would be to seriously hinder the use of the bus as a significant instrument of energy conservation, as a fuel-saving alternative to the private car. Secondly, the repeal of the excise taxes would have the greatest impact on minorities, young people with limited incomes, and senior citizens. It is an undisputed fact that intercity bus travel is not only the most fuel-efficient form of transportation, but is also the most attractive to those with fixed incomes and limited budgets. The average price of the bus ticket in 1981 was $10.20. As the increased operational cost of the excise taxes must be passed on to the consumer, it is obvious that groups most impacted by additional costs would be minority groups, young people with limited means, and senior citizens. Sixty percent of the passengers who use intercity bus services have incomes under $15,000 per annum.

The amount of money that would be raised by repealing the intercity bus industry exemptions would be infinitesimal in relation to the overall amount of money that is sought to fund the highways, but it is important to our bus operators, who are largely small businessmen. A few thousand dollars added for taxes could mean the difference in profit or loss for many of them.

Over the years, the private bus industry has fundamentally paid its own way, unlike other modes. The documentation associated with the 1975 DOT Trends and Choices indicates that up to that point, the intercity bus operators had been paying 25 percent more than their fair share. Even the Final Report of the Cost Allocation Study acknowledges that in the base year 1977, intercity buses' ratio of user charges to allocated costs was 1.2 under the current user charge structure (Table I-7, vol.I). The ratio is 1.16 if cost responsibility under the recommended approach is measured (Table VI-10, vol. I). We concede that under the current user charge structure, the intercity bus industry is receiving a subsidy, but this subsidy is clearly miniscule -- less than three-tenths of one percent of the total yearly trust fund receipts. This is particularly insignificant in comparison to other passenger modes. It is certainly not an undue amount nor unwarranted in view of the full range of energy and public benefits attributable to a fuel-efficient, economical, pervasive system of bus service.

Finally, the federal government should redress the tremendous imbalance in its treatment of the various passenger modes before it imposes any added burden on the private intercity bus industry.

The Department of Transportation has recently pointed out that Amtrak receives a subsidy of $35 per passenger and has been given nearly $10 billion in subsidy (counting the Northeast Corridor Project) since 1970 - 1971. The airlines are subsidized 77 cents per pasenger, according to the Department of Transportation, while bus operators may be receiving 8 cents per passenger. While these modes have received bountiful subsidies which allow them to divert passengers from us, the Department of Transportation has not proposed the elimination of all subsidy to Amtrak or the airlines. Only when that is achieved, in our view, is it equitable to consider repeal of the excise taxes in question.

We appreciate your taking the comments of the American Bus Association into consideration, and we will, of course, be pleased to answer any questions you have and to provide any additional information you need.

THE FOLLOWING RESOLUTIONS WERE SUBMITTED BY THE NATIONAL ASSOCIATION OF COUNTIES

RESOLUTION ON TRANSPORTATION BUDGET CUTS

WHEREAS, the administration has proposed to reduce federal spending in transportation programs in an effort to balance the budget, control inflation, and restore the economic vitality of the nation; and

WHEREAS, the National Association of Counties' policy supports such an effort;

THEREFORE, BE IT RESOLVED, That the National Association of Counties suggests that, at least $12 billion OF such cuts be apportioned to the Interstate completion program through mandated caps on the number of lanes on Interstate segments not currently at capacity and limitation on escalating nonstructural and nonsafety enhancements; and

BE IT FURTHER RESOLVED, that the National Association of Counties questions the advisability at this time of earmarking specific transportation programs to be eliminated through cuts without careful review of their importance to the nation's transportation infrastructure, energy independence, and economic and commercial health.

✓RESOLUTION ON THE REAUTHORIZATION OF FEDERAL AID HIGHWAY PROGRAMS

WHEREAS, the National Association of Counties acknowledges the need for federal budgetary restraint in the light of increasing inflation; and

WHEREAS, the National Association of Counties reaffirms its commitment to increased funding for the maintenance and repair of the nation's existing but deteriorating highway network; and

WHEREAS, the National Association of Counties continues to support the inclusion of total bridge needs in the bridge apportionments authorized by Congress as part of its highway reauthorization legislation; and

WHEREAS, the National Association of Counties urges Congress to acknowledge the importance and critical nature of the backlog of off-system as well as on-system deficient bridges and to provide adequate funding for these needs; and

WHEREAS, the National Association of Counties supports the consolidation of rural highway programs with compatible goals to increase the flexibility in the use of rural highway funds by states and localities; and

WHEREAS, the National Association of Counties accepts the need for a greater state and local matching share in financing federally assisted rural and urban highway projects; and

WHEREAS, the National Association of Counties strongly supports the certification acceptance process, designed to streamline federal regulations and to reduce red tape and costly delays in highway construction projects; and

WHEREAS, the National Association of Counties supports a continued federal role in highway safety programs, such as the safer off-system, as legitimate and essential; and

WHEREAS, the National Association of Counties supports integrating priority primary projects into an expanded primary program if the funding for projects already underway is secured;

THEREFORE, BE IT RESOLVED, that the National Association of Counties endorses the most cost-effective approach to Interstate completion focusing on the construction of essential "gaps" and supports a greater emphasis on Interstate resurfacing, restoration, rehabilitation, and reconstruction by raising the federal share and authorizations dedicated to these projects; and

BE IT FURTHER RESOLVED, that the National Association of Counties endorses assigning equal weight to off-system bridges in future state apportionments and reaffirms its support for raising the minimum that can be spent on these bridges to 25 percent, removing the ceiling on what can be spent on the off-system, and shortening the period bridge funds are available from four to two years; and

BE IT FURTHER RESOLVED, that the National Association of Counties endorses the incorporation of the federal aid secondary system into an expanded rural program, including other rural highway programs with compatible goals if authorizations are sufficient to meet increased program needs or funds are sufficiently targeted to projects on highest priority, major collector highways; and

BE IT FURTHER RESOLVED, that the National Association of Counties accepts decreases in the federal matching share for the federal aid secondary or rural program only if they are accompanied by measurable decreases in federal regulations and/or standards and commensurate with local and state governments' ability to compensate for lost federal assistance and continue needed highway projects; and

BE IT FURTHER RESOLVED, that the National Association of Counties strongly supports a strengthened role for responsible local officials in selecting the projects to be accorded federal assistance along with local financial support for these projects; and

BE IT FURTHER RESOLVED, that the National Association of Counties supports those provisions expanding the certification acceptance process to other types of federal aid projects and other regulatory areas where state laws are adequate to implement federal requirements such as environmental protection, land acquisition, and uniform relocation; and

BE IT FURTHER RESOLVED, that the National Association of Counties urges Congress to provide incentives to states to adopt certification acceptance procedures and delegate inspection and monitoring responsibilities to local road officials possessing the needed professional expertise to fulfill them; and

BE IT FURTHER RESOLVED, that the National Association of Counties endorses continued federal support for needed highway safety projects through a consolidated safety program with added flexibility for states and localities to concentrate federal assistance on highest priority safety needs, providing authorizations are sufficient to meet these expanded needs; and

BE IT FURTHER RESOLVED, that the National Association of Counties urges Congress to "grandfather" priority primary projects already underway, guaranteeing them continued funding should they be incorporated into an expanded primary program.

✓RESOLUTION IN SUPPORT OF INCREASED HIGHWAY USER FEES

WHEREAS, a well maintained highway system is essential to the health of the economy, the viability of interstate commerce and personal mobility and serves as the infrastructure of an effective national defense;

WHEREAS, repair and construction costs are escalating yearly at a rapid rate on all highway systems including the Interstate, Primary, Urban and Secondary Systems, while trust funds revenues are steadily declining due to advances in motor fuel economy and a shrinking tax base unchanged since its inception;

WHEREAS, counties are responsible for the maintenance and repair of the majority of highways included in the Federal Aid Secondary and many of those included in the Federal Aid Urban System;

WHEREAS, the current four cent per gallon highway user fee does not generate sufficient revenue to fund completion of the Interstate, Interstate Transfer Projects, and to preserve current performance conditions on the existing Federal Aid Highway System;

WHEREAS, the Secretary of Transportation, therefore, supports a five cent increase in highway user fees to finance growing highway and transit capital needs;

WHEREAS, the National Association of Counties supports an effective public transportation trust fund and a stable and reliable source of federal support for public transportation as essential to effective public transportation facilities and programs;

WHEREAS, the President has proposed to turn back to states and local governments transportation programs vital to counties and pledged to return with them the revenue sources to pay for them;

THEREFORE, BE IT RESOLVED, the National Association of Counties supports a five cent increase in the federal motor fuel tax and other user tax such as those on heavy trucks for the purposes of raising revenues sufficient to meet the rising costs of maintenance and repair on the Federal Aid Highway System as presently constituted and to finance transit capital needs critical to counties, setting aside four cents for highways and one cent for transit capital needs;

BE IT FURTHER RESOLVED, the National Association of Counties would only support a five cent highway user fee increase in the event of a turnback of some transportation programs to states and local governm;ents if at least two cents of the additional revenues will be returned to the states and localities to provide an ongoing source of funding dedicated to financing those transportation programs turned back.

BE IT FURTHER RESOLVED, the National Association of Counties supports a one year extension of highway and transit legislation if a user fee increase is not enacted by Congress this year.

Resolution on

Increases in Truck Size and Weight and User Fee Increases for Heavy Trucks

WHEREAS, the National Association of Counties supports protection of our nation's highway investment and a greater emphasis on Interstate resurfacing, restoration rehabilitation, and reconstruction to preserve it;

WHEREAS, increases in gross vehicle and axle weight cause increasingly greater rates of pavement and bridge damage;

WHEREAS, the rising numbers of heavier and larger trucks will increase their responsibility for future highway damage;

WHEREAS, according to the Federal Highway Cost Allocation Study, heavy combination trucks currently pay only 65 percaent of the costs they incue;

WHEREAS, Light trucks, vans and pick-ups pay more than their share of highway user costs because existing truck taxes are not graduated by weight.

WHEREAS, increased national standards for vehicle length and width will raise highway costs and create additional safety problems;

THEREFORE BE IT RESOLVED, that the National Association of Counties will oppose further increases in truck weight unless they are accompanied by simultaneous and sufficient increases in the highway user fees paid by heavy trucks to compensate for the additional highway and bridge damage they will cause.

BE IT FURTHER RESOLVED, the National Association of Counties supports changes in the highway user tax structure, such as a graduated tax on a vehicle's registered gross weight, which insure that heavier vehicles pay a larger share of future highway costs.

BE IT FURTHER RESOLVED, that the increases in truck size and weight be applicable only to those roads where the design is adequate to safely accommodate that increase.

BE IT FURTHER RESOLVE, that the National Association of Counties will oppose increased national standards for truck length and width until their impact on highway costs and safety have been assessed and reflected in the highway user fees and appropriate safety regulations.

RESOLUTION ON GEOMETRIC DESIGN STANDARDS
FOR NON-INTERSTATE RESURFACING, RESTORATION AND REHABILITATION PROJECTS

WHEREAS, the National Association of Counties reaffirms its commitment to greater federal funding and emphasis on highway resurfacing, restoration and rehabilitation (3R);

WHEREAS, the National Association of Counties strongly supports a leadership role for states, counties, and other localities in reducing the nation's accident rate on the highways for which they are responsible through adoption of effective and safe standards for future 3R work;

WHEREAS, the National Association of Counties strongly supports the intent of the Federal Highway Administration's (FHWA) final rule on geometric design standards for 3R work in permitting states and localities the flexibility to cooperatively develop their own 3R design standards;

WHEREAS, pending House legislation specifically prohibits the FHWA's approach to 3R design standards;

THEREFORE BE IT RESOLVED, that the National Association of Counties urges the House Committee to Public Works and Transportation to reconsider its approach to 3R design standards for non-Interstate highways in H.R. 6211;

BE IT FURTHER RESOLVED, that the National of Association Counties urges the House Committee on Public Works and Transportation to grant a trial period to implement and judge the safety and effectiveness of the FHWA rule before precluding this approach in its highway reauthorization legislation;

BE IT FURTHER RESOLVED, that the National Association of Counties urges the FHWA to insure that the requirements of its technical advisory on the rule be implemented in a flexible and workable manner, emphasizing safety and cost effectiveness as its major goals.

National Conference of State Legislatures

Office of
State
Federal
Relations

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202/737-7004

President
William F. Passannante,
Speaker Pro Tempore,
New York Assembly

Executive Director
Earl S. Mackey

August 19, 1982

The Honorable Steven Symms
Chairman
Senate Subcommittee on Transportation
Russell Senate Office Building
Room 452
Washington, D.C. 20510

Dear Senator Symms:

Thank you for the invitation to testify on behalf of the National Conference of State Legislatures before the Subcommittee on Transportation on the issue of current highway needs versus existing highway revenues. Unfortunately, time pressures prevent me from leaving my law practice and traveling to Washington for the hearing. I will, however, take this opportunity to express the views of NCSL on highway needs and revenues.

The National Conference of State Legislatures adopted a revised policy on highways at our July annual meeting in Chicago. A copy of that policy is enclosed. A major element of the new policy is the endorsement of an increase in the federal motor fuel tax. This endorsement combined with our previously developed federalism policy that was reaffirmed in Chicago places us on record as favoring the following three-part package for addressing our nation's highway needs.

1. Raise revenues that flow into the Highway Trust Fund - The first source of higher revenues should be the non-motor fuel taxes that support the trust fund. These should be raised in a manner consistent with the federal cost allocation study. There should also be a moderate increase in the federal motor fuel tax.

2. Turn back to states some federal highway programs - NCSL favors returning to state control the Urban and Secondary highway systems, that part of the Bridge program which involves bridge projects on these two systems and off-system bridges, and that part of the Highway Safety Construction program that involves the Urban and Secondary systems.

3. Turn back to states revenues to pay for the returned highway programs - The federal government should return to the states revenues from the Highway Trust Fund sufficient to cover the costs of the returned programs. While not specifically endorsing the National Governors' Association policy of a turn back of 2¢ of the motor fuel tax, NCSL favors the NGA turn back approach.

Returning highway programs and revenues to the states is a top priority of NCSL. Progress along these lines should not be held up by delays in President Reagan's complete new federalism package. We urge Congress to address federalism in the highway area in a separate bill.

I believe NCSL's new policy which was carefully developed through the four meetings of our Transportation and Communications Committee during the past year is a good one, and covers most of the issues your subcommittee is addressing in your hearings. We received input from many sources. You and Congressman Anderson addressed our committee at its meeting here in Washington last December. Jean Schrag from your subcommittee and Kevin McCarthy from the House Public Works and Transportation Committee addressed the committee when it met in April. Officials from the Department of Transportation, including Ray Barnhart, spoke to the committee at three of its meetings. We will now be working to support our policy during the upcoming year.

We look forward to continuing to work with you and your staff during the debate on the shape of the federal highway program.

Sincerely,

Joseph Accardo

Joseph Accardo, Jr.
Chairman
Transportation and Communications
Committee

enclosure
JA/rb

National Conference of State Legislatures

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State
Federal
Relations

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President
William F. Passannante,
Speaker Pro Tempore,
New York Assembly

Executive Director
Earl S. Mackey

HIGHWAY RESOLUTION

Approved by NCSL Annual Business Meeting; July 29, 1982

Highway Finance

Current revenues that support the federal highway program through the Highway Trust Fund are inadequate to meet the needs of our highway system. The costs of completing the Interstate system, rebuilding deteriorated open segments of the Interstate system, rebuilding and repairing the nation's bridges, and providing for other federal highway needs is growing. Revenues flowing into the Highway Trust Fund are not growing. The result is a sharp drop in the balance of the Highway Trust Fund and the inability to fund programs at needed levels. The federal cost allocation study provides a good summary of present inequities in the federal highway revenue structure. Therefore, the NCSL believes:

- o Congress and the Administration should take steps to increase revenues for the Highway Trust Fund. The first source of higher revenues should be non-motor fuel taxes that support the trust fund. These should be raised consistent with the findings of the federal highway cost allocation study.
- o There should be a moderate increase in the federal motor fuel tax, but such increase must be coupled with a substantial turnback of federal highway revenues and program responsibilities to the states. A portion of the increase in the new revenues should be used to support capital and maintenance expenditures of state and local transit systems.
- o The Highway Trust Fund should be extended through at least 1990. Trust fund revenues should be expended only for highway and bridge projects.

Highway Federalism Turnback to States

The federal government is overloaded with too many responsibilities that are primarily state and local concerns. Since December 1981, NCSL and the National Governors Association have endorsed the idea of a stronger role for states in the transportation area. The federal Urban and Secondary (rural) road systems carry primarily intrastate and local traffic. Returning control of these systems to the states would eliminate federal red tape and delays that increase construction and maintenance costs. The federal government, however, should not return highway programs to the states without also returning sufficient revenues to support the programs. Therefore NCSL believes:

- The federal government should turn back to state governments the responsibility for operating the current Urban Highway program, Secondary Highway program, that part of the Bridge program which involves bridge projects on these two highway systems and off-system bridges, and that part of Highway Safety Construction program that involve the Urban and Secondary systems. The federal government should also turn back to the states adequate federal funds for the programs (turn back based on present budget levels).
- The turnback of these highway programs and highway revenues should be authorized by legislation separate from the remainder of President Reagan's proposed New Federalism program.

Highway Program Reform

Congress must reauthorize all federal highway programs this year. At the present time there are too many categorical highway programs, too little flexibility for using program funds, and too much red tape in the federal highway program. Therefore, NCSL believes:

- Congress should enact federal-aid highway program reforms including the authorization of only six categorical programs: Interstate construction, Interstate 4R, Primary, Bridge, Safety, and Public Lands. (The Urban and Secondary programs should be returned to state control with adequate funding.) These programs should not be burdened with earmarking for special projects or subprograms within the categories. In addition, transferability of funds between the programs should be increased over current law.
- NCSL supports the current efforts of the Federal Highway Administration to cut down on the administrative red tape in the federal highway programs.

Highway Maintenance and Repair

The maintenance and repair needs of the nation's highways and bridges are growing. In recent years Congress has recognized this fact by increasing maintenance and repairs funding. However, the pace of this change has been too slow. In a recent report on the Interestate highway system, the Congressional Budget Office estimates that the federal government should be spending at least as much and probably more on the Interstate 4R program as Interstate Construction. In addition, funding for the Bridge program should be increased. Therefore, NCSL believes:

- Congress should authorize as much funds for the Interstate 4R program as the Interstate Construction program.
- Congress should increase funding for the Bridge program.

THE
NATIONAL
INDUSTRIAL
TRAFFIC
LEAGUE

1090 Vermont Avenue, NW
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(202) 842-3870

Office of the Executive Vice President

August 30, 1982

The Honorable Steve Symms
Chairman
Subcommittee on Transportation
Committee on Environment and Public Works
United States Senate
4202 Dirksen Senate Office Building
Washington, DC 20510

Dear Chairman Symms:

We respectfully request that the enclosed statement be made part of the hearing record being developed on the issue of highway funding and the Department of Transportation's Cost Allocation Study.

The National Industrial Traffic League is a voluntary organization of 1,800 shippers, shippers' associations, boards of trade, chambers of commerce, and other entities concerned with rates, traffic, and transportation services of all modes. It is the only nationwide organization representing all types of shippers using all modes of transportation to move all types of commodities. Our members, directly or indirectly, are responsible for the routing of about 80% of our country's commercial freight.

The League supports ensuring that all users of our federal highway systems contribute their fair share to its maintenance and rehabilitation. We also believe that increases in Highway Trust Fund taxes will be necessary to assure that this system is capable of meeting the nation's commercial and defense needs.

However, we also believe that any increases in these taxes should be linked with a standardization of the dimensional limits imposed on trucks moving interstate commerce. Setting minimum national dimensional standards for truck transportation is of critical importance to U.S. business and industry because the operations of U.S. producers are essentially interstate in nature.

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DIRECTOR OF MEMBER SERVICES

The Honorable Steve Symms
Page Two
August 30, 1982

This nation cannot have a productive and fuel-efficient truck transportation network if it is faced with a patchwork of differing size, bridge-formula, and weight standards.

The League looks forward to working with you and the subcommittee so that our mutual goal of assuring that this country has access to an adequately financed and efficient national truck transportation system.

Sincerely,

James E. Bartley

James E. Bartley
Executive Vice President

cc: Jean Schrag

STATEMENT

ON BEHALF OF

THE NATIONAL INDUSTRIAL TRAFFIC LEAGUE

BEFORE

SUBCOMMITTEE ON TRANSPORTATION

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

AUGUST 30, 1982

The National Industrial Traffic League is a voluntary organization of 1,800 shippers, shippers' associations, boards of trade, chambers of commerce, and other entities concerned with rates, traffic, and transportation services of all modes. It is the only nationwide organization representing all types of shippers using all modes of transportation to move all types of commodities. Our members, directly or indirectly, are responsible for the routing of about 80% of our country's commercial freight.

The League's primary concern is to assure that our national transportation system is sound, efficient, well-managed, and privately owned and operated, and that it meets the needs of the nation as well as those of shippers and receivers of commerical freight. To arrive at the policies and positions reflecting our broad range of interests, League members, at least annually, meet to consider, debate, and vote on pertinent transportation issues. Throughout our 75-year history, the League frequently has been the spokesman for business and industry on transportation matters.

THE LEAGUE'S PERSPECTIVE

The League strongly supports ensuring adequate financing of our national highway system, and fully recognizes that there must be increases in the current Highway Trust Fund taxes if this country is to reverse the deterioration of our national highway system. This deterioration, coupled with the current regulatory patchwork of conflicting size, bridge-formula, and weight standards, impedes efforts to assure our country of a truly efficient and safe national truck transportation system.

We concur with the Administration that any increases in these highway taxes must be coupled with standardizing the dimensional limits imposed on trucks travelling in interstate commerce.

Improving the condition of our nation's highways and bridges as well as standardizing these dimensional limits are of critical importance to business and industry, since their operations are essentially interstate in nature. Perpetuating current conditions will lead to increased operational costs for U.S. producers, and, ultimately, to higher prices for the U.S. consumer.

IDENTIFYING THE PROBLEM

As indicated by your subcommittee's recent hearings, there is a great deal of controversy surrounding the interrelationship of factors which lead to highway and bridge pavement deterioration. Some interests place the primary blame on heavy or large trucks; others place it on weather and normal wear. It has been clearly demonstrated that roads without truck traffic deteriorate, and that roads with heavy truck traffic deteriorate faster in certain lanes than in others.

The League wishes it could provide the subcommittee with a definitive answer to this controversy. However, our experience has shown that these factors as well as a variety of others all contribute to highway and bridge deterioration. We believe that any attempt to isolate the impact of any one factor and apportion its fair share of maintenance and repair costs, including those offered by the DOT, is judgmental. As evidenced by the conflicting opinions of experts in this area, there is just not enough hard statistical data at this time to make a definitive assessment.

One factor that appears to have a positive impact on reducing the rate of deterioration is prompt repair and regular maintenance. Those states which take immediate care of such minor problems as potholes appear to have a better highway system than those that do not make such efforts.

ALLOCATION THEORIES

As the DOT, American Trucking Associations, and others have demonstrated, there are a variety of methodologies which can be advanced to uphold any one group's perspective on the issue.

However, we would urge caution in accepting the allocation theories offered by DOT's Federal Highway Administration. As noted in testimony by the Western Highway Institute at your August 18 hearing, it can be argued that the FHWA selected a methodology which "proves" that trucks do not pay their "fair share" of highway costs.

As pointed out by the WHI, while the cost allocation study yields technical results that support this contention, there is no broad-based documentation correlating pavement's service life characteristics with the results predicted in the AASHO road test "Weight Only" relationships. By assigning that degree of emphasis to "equivalent single axle loads," a bias is created against heavier vehicles.

A recent Carnegie Mellon University study, "Analysis of Economic Issues Inherent in the Allocation of Highway Program Costs," which was commissioned by the FHWA as part of its Cost Allocation Study, analyzes the theories which may be used to assign costs to the various user classes and the practical limitations of each theory.

With respect to the incremental method of cost allocation, the traditional means of cost allocation, the major problem is identifying the marginal user: Is it trucks or autos? The attributable cost usually depends on the answer to this question.

With respect to marginal cost pricing, a problem occurs in collection of these costs. It could well result that collection of these costs could be less than the present system of average cost plus user charge.

The key point of this study, with which the League concurs, is: Since there are so many judgment decisions to be made under each theory, analysis can only help determine the range of reasonable road user charges and their implications and probable impacts. However, achieving the goal of revenue equalling costs will lead to the final decision being political rather than technical.

STRUCTURE OF ANY TAX INCREASE

While the League is still analyzing the various proposals for increasing the highway taxes, we do believe that the following considerations should be made with respect to any tax increase plan that may be offered for Congressional action:

-- Exemptions should be minimized. In 1977, $400 million in revenues were exempted. While exemptions aid in meeting certain policy goals, they also increase the inequality of any tax structure. This holds true whether the exemption is granted for government vehicles, special fuels, bus operators, or any other social objectives.

-- Tax structures should provide for feasible methods for administration and collection both by the government and truck operators, for assured compliance levels, and for equity to the various classes of vehicles.

For example, waiving the manufacturers' excise tax on trailers for trailers moved in intermodal hauls (piggyback) would be unenforceable because these vehicles are used interchangeably in piggyback and over-the-road operations. Maintaining adequate records to apportion use would be an administrative nightmare for both industry and the government. It also could alter the nature of these operations for other than commercially sound reasons.

Another example is how to apply the excise tax on truck parts and accessories, since many of these parts and accessories are interchangeable with truck trailers. Many of the same problems associated with waiving taxes for intermodal trailers would apply to this situation.

A third example is the current heavy use tax of $3 per thousand pounds of gross vehicle weight -- about $225 on a truck having 75,000 pounds GVW. At present, the Treasury Department and others have found this tax to have an unacceptable collection rate (about 60% to 80%). Unless collection problems are solved, there is no guarantee that raising this tax to the DOT-suggested level of $1,980 for the same vehicle will result in the revenues anticipated. In addition, this tax, as recognized by DOT and others, places an unfair burden on low-use vehicles such as intra-city vehicles, piggyback draymen, and others.

One other example would be to grant rebates on at-the-pump gas taxes. Again, serious questions are raised about administrative burdens and costs as well as enforcement and collection compliance. However, the League would note that there is a resonable connection between fuel economy and vehicle weight, since lighter vehicles tend to be more fuel efficient.

NON-FUNDING SOLUTIONS

In considering solutions to the deterioration problem, the League believes that the answers extend beyond increased funding to include certain program changes and better application of engineering principles. Some basic recommendations in this area would be:

— Recycling used pavement materials so that they can be used to help construct or repair new or exisiting roadways. This practice has been used in Holland for more than 20 years. It is being experimented with in the U.S., and is proving very successful in containing costs.

- -- Improving fundamental design standards to provide long pavement life at low maintenance costs. For example, expanded use of steel beams that develop an oxide surface that does not deteriorate or require painting.

- -- Standardizing engineering designs to reduce the engineering and administration costs so that a higher percentage of funding can be dedicated to actual construction.

- -- Using prefabricated components such as bridge decks and/or concrete and steel culverts, which can be made more cost efficiently under factory, rather than field, conditions.

- -- Using advanced technology to build good facilities at controlled costs. For example, automated median forming machines.

- -- Tightening program standards and improving enforcement so that opportunities for fraud and other abuses can be further eliminated.

PRODUCTIVITY

As noted earlier, the League strongly believes that any increase in highway taxes should be linked to eliminating the regulatory patchwork on truck dimensional standards. For your information, attached is a copy of our most recent testimony on this issue.

In closing, the League is dedicated to preserving an efficient and safe national truck transportation system. We look forward to working with the subcommittee to obtain adequate and equitable financing of this system as well as to remove any uneccessary regulatory burdens which prohibit increased efficiency in its operation. We thank you for this opportunity to present the views of business and industry, the users of freight transportation services.

VICTOR ATIYEH
GOVERNOR

Department of Transportation
HIGHWAY DIVISION
TRANSPORTATION BUILDING, SALEM, OREGON 97310

May 20, 1982

In Reply Refer to
File No.
PLA

The Western Association of State Highway and Transportation Officials (WASHTO) continues to have a strong interest in the subject of truck size and weight limits. For some time, WASHTO has been working in conjunction with the highway transport industry toward the establishment of uniform western regional truck size and weight standards. The WASHTO/HTI Joint Committee position was unanimously reaffirmed at a recent meeting of the chief administrative officers of WASHTO in Salt Lake City attended by 13 of the 15-member states (representatives from California and Hawaii were unable to attend).

WASHTO fully recognizes the benefits to be derived from increased national uniformity of truck sizes and weights. Nevertheless, we are opposed to certain provisions of the truck size and weight legislation (S. 1402 and H.R. 6211) now being considered by Congress. I have been asked to relay the position of the highway or transportation agencies of the western states for your consideration in developing our national legislation.

Our concern is based on the following points:

1. The amount of turning clearance required for a truck tractor/semitrailer combination increases substantially with slight increases in trailer length. For example, a 48-foot semitrailer requires five feet more clearance when going around a corner than does a 45-foot semitrailer. This additional required clearance would present serious problems at street intersections and interchange ramps. For this reason, WASHTO strongly recommends that the standard for semitrailers should be the 45-foot length supported by the western region representatives of the highway transportation industry. This recommendation is included in the attached resolution adopted by WASHTO a few years ago.

In summary, the three concerns I was asked to relate to you are:

(a) Standard semitrailer lengths should be limited to 45 feet.

(b) States should be able to work with the industry toward permitting in some locations the operation of more productive commercial vehicle combinations.

(c) Changes in truck size and weight should be reflective of the Federal Cost Allocation Study.

H. S. Coulter, P.E.
State Highway Engineer

HSC:ia

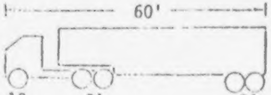
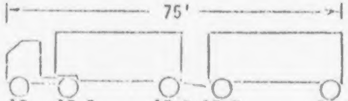
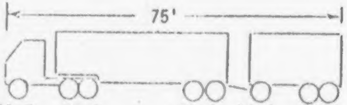
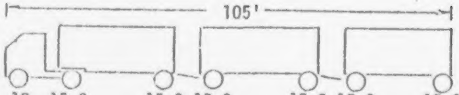
Att.

cc Francis B. Francois
Executive Director, AASHTO

Byron L. Geuy
Executive Director, WHI

WASHTO Chief Administrative Officers

COMPARISON OF PAYLOADS AND AXLE WEIGHT EQUIVALENTS

	le weights 1000s	,000-pound le equiv. . .	Gross Weight	Gross Pay Load	Trips to Move 100,000 tons	18,000-pound axle Equivalent
 60'	12 34 34	0.36 1.45 1.45	80,000	44,000	4,545	14,816
 75'	10 17.5 17.5 17.5 17.5	0.16 0.88 0.88 0.88 0.88	80,000	45,000	4,444	16,354
 75'	11.6 29.6 31.4 13.8 19.1	0.30 0.80 1.03 0.32 0.24	105,500	65,650	3,046	8,194
 105'	10 15.9 15.9 15.9 15.9 15.9 15.9	0.16 0.59 0.59 0.59 0.59 0.59 0.59	105,500	61,000	3,279	12,233

RESOLUTION

WHEREAS, the Joint WASHTO-HTI Committee has for some time been working toward identification of certain areas where greater uniformity may be realized with respect to vehicle size and weight standards required of the highway transport industry operations in the contiguous western states; and

WHEREAS, there appears to be agreement on some specific standards that would be beneficial to both the states and the highway transport industry if necessary changes are made in existing state and federal laws, rules, and regulations; and

WHEREAS, the specific standards for which there is substantial agreement for vehicles in regular operation on certain highways as designated by the individual states are as follows:

1. Width - No vehicle, including load and load-holding devices but exclusive of tire bulge and approved safety devices, shall exceed a width of 102 inches.
2. Height - No vehicle, including load and load-holding devices, shall exceed a height of 13 feet-6 inches.
3. Lengths -
    - A. No single truck or truck-tractor, including any load thereon and inclusive of any bumpers, shall exceed 40 feet.
    - B. No single two-axle or three-axle bus, inclusive of any bumpers, shall exceed 40 feet.
    - C. No single full trailer, including any load thereon and inclusive of any bumpers, shall exceed 40 feet.
    - D. No single semitrailer, including any load thereon and inclusive of any bumpers, shall exceed 45 feet.
    - E. No tractor semitrailer combination, inclusive of any bumpers, shall exceed 60 feet.
4. Axle Weights -
    - A. The total gross weight imposed on the highway by the wheels of any one single axle shall not exceed 20,000 pounds.

BE IT FURTHER RESOLVED that the WASHTO-HTI Joint Committee shall continue efforts to obtain agreement on those standards still to be resolved; and

BE IT FURTHER RESOLVED that the Congressional Delegations from the respective WASHTO states be furnished copies of this resolution as evidence of the ongoing efforts toward agreement concerning vehicle dimension and weight standards.

DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

ASSISTANT SECRETARY

NOV 10 1982

Dear Mr. Chairman:

Enclosed are responses to the questions you sent relating to my testimony before the Subcommittee on Transportation on financing Federal highway programs.

Sincerely,

J. Gregory Ballentine
Deputy Assistant Secretary
(Tax Policy)

The Honorable
Steve D. Symms
Chairman
Subcommittee on Transportation
Committee on Environment
and Public Works
United States Senate
Washington, D.C. 20510

Enclosure

Responses to Follow-up Questions on Testimony by J. Gregory Ballentine, Deputy Assistant Secretary (Tax Analysis), Department of the Treasury, Before Senate Committee on Environment and Public Works

1. The Congressional Budget Office, in its recent study of the Interstate System, describes the present inadequate financing of highway needs, stating that "...the present program is trying to do too much with too little, and is not succeeding on any front." You testified that the current level of funding does not make a tax increase necessary. Would you explain why you believe funding levels are adequate?

A. In my statement, I pointed out that existing tax rates will provide sufficient revenues to maintain an adequate balance in the Highway Trust Fund, given current spending projections. I did not specifically address the question of whether or not higher levels of highway expenditures are desirable.

The Office of Management and Budget is responsible for reviewing proposed expenditure programs by agencies of the government and determining priorities among competing demands on public resources. In the past year, the Office of Management and Budget gave careful consideration to proposals to increase the level of Federal highway funding. However, as part of its policy of restraining Federal expenditures, the Administration decided not to recommend increases in highway funding in 1982. Proposals for increasing Federal highway funding will be reviewed again as the Administration prepares budget recommendations for FY 1984.

As I stated in my testimony, the Treasury Department strongly supports continued reliance on user taxes to finance highway program costs. If a decision were made to increase Federal highway expenditures, we would favor increases in highway user taxes to generate the necessary revenues.

2. Section 507 of the Surface Transportation Assistance Act of 1978 directed the Secretary of the Treasury to make certain recommendations to Congress on the administration of highway user fees by April 15, 1982. Will the Department be submitting this report within the six to eight week timeframe you mentioned at the August 18, 1982 hearing?

A. We are working on the study and expect to complete it in the near future.

3. Do you believe there are any existing highway user fees that should be eliminated altogether?

A. In the Second Progress Report on the Study of the Highway Excise Tax Structure, issued by the Department of the Treasury in October, 1981, we suggested that repeal of the tax on lubricating oil should be seriously considered. Consideration is also being given to removing the parts and accessories tax from all except certain major components that yield significant revenue. However, any recommendation to eliminate any one particular tax should be accompanied by other changes to ensure that an adequate level of revenue is maintained.

4. What particular highway taxes do you think most fairly recoup revenue from vehicle groups?

A. Ideally, highway user charges should vary among users by amount of highway use and with the relative damage different types of vehicles impose on highway surfaces, per mile driven. No single tax or set of taxes imposed on fuel consumption, vehicle sales, sales of vehicle parts, or vehicle registrations can accomplish this equity objective as effectively as would direct charges (tolls) on highway use. In the absence of direct pricing through tolls, equity can be best served by a combination of taxes on fuel use, vehicle and parts sales, and registrations rather than by reliance on any one single tax base.

5. Could you summarize your findings to date on the major ways in which the collection and administration of user fees could be improved?

A. In the Second Progress Report, we discussed a number of possible ways of improving collection and administration of the current user fees. In particular, we discussed ways of enlisting the cooperation of the states in enforcing or collecting the highway use tax on heavy vehicles and considered alternatives to current administration of the excise tax on diesel fuel.

We are currently reviewing analysis prepared at the staff level with officials at IRS to determine what final recommendations to make on improved compliance. These recommendations will be discussed in our forthcoming report.

6. It has been suggested that states might assist in the collection of the truck use tax. Has the Department explored this option? Do you believe the states would be helpful in collecting any of the other use taxes? What do you see as the advantages of having states participate in collecting these taxes?

A. The Treasury Department has explored the option of enlisting state assistance in collecting the heavy vehicle use tax. Treasury and IRS staff have met several times to discuss options with the American Association of Motor Vehicle Administrators (AAMVA). The AAMVA was interested in exploring the feasibility of these ideas and has prepared a questionnaire for state administrators requesting their views. We are looking forward to reviewing the questionnaire with AAMVA.

In addition, California has authorized a pilot project to refuse to register vehicles that have not paid the Federal heavy vehicle use tax. IRS has discussed this project with state representatives at a staff level. In addition, IRS representatives are available to discuss the feasibility of a project along these lines with the California Division of Motor Vehicle Administrators.

There are two major advantages that could be derived from state assistance in collection of the heavy vehicle use tax. First, since states already have registration systems, state assistance in identifying individuals liable for the tax would make outright evasion very difficult. Second, state participation would simplify filing and payment of the Federal tax, since returns could be submitted in conjunction with registration and with payment of similar taxes owed to states.

We have not at this time given consideration to enlisting state assistance in collection of any of the other highway user taxes. If the diesel fuel tax were to be increased, it might be worthwhile to consider seeking state assistance in enforcement. It is unlikely that state assistance would be helpful in collecting any of the other highway user taxes because they are collected from a limited number of manufacturers, producers, or importers.

7. What problems, if any, do you see with state participation in the collection of the use or axle weight tax and with states retaining a certain percentage of the revenue for administrative costs?

A. There are several potential problems that might result from state participation in collection of a use or axle weight tax.

First, some states might refuse to participate, or, if required to do so, might be unenthusiastic. To the extent states are not interested in participation, there could be a lack of uniformity in enforcement.

Second, if states want reimbursement for collection costs, the amount of reimbursement needed might exceed the current cost of collection. However, these additional costs could well be offset by the revenue gain from more effective enforcement, especially if the tax is restructured and increased.

Finally, there are differences among states that could add to administrative problems. States have different registration periods and different definitions of weights for registration requirements, and states differ among each other in the tax base used for state registration or vehicle use taxes. Also, there are different definitions of what trucks need to be registered for different purposes.

Notwithstanding these problems, we believe that there are potential benefits from cooperation with the states in collecting the heavy vehicle use tax and we intend to continue to explore steps in that direction.

8. If the present heavy vehicle use tax were restructured to more closely match vehicle cost responsibilities, which of the following options do you see as the most feasible?

- o have states integrate collection of the Federal tax with state registration systems;

- o have states withhold their registration in cases where payment of the Federal tax could not be proven;

- o have states send the IRS information returns showing ownership, leasing, and taxable weight;

- o have a decal/sticker system, much like state-wide systems presently in operation.

The most feasible option, if all states were to agree, would be to integrate collections.

Having states withhold their registration in cases where Federal tax payment could not be proven might be more acceptable to some states and would have the same effect as integrating collections. However, this option would cause some inconvenience for taxpayers who would have to engage in two separate transactions -- payment of the tax to the IRS and then certification by the state that the tax has been paid.

Information returns would be helpful in administering the tax if the IRS could obtain data in a format compatible with the structure of the Federal use tax. However, if states are to go to the effort of assembling the needed information for the IRS, there would be little extra effort needed actually to collect the tax.

A decal/sticker system would be difficult to enforce because there is no Federal highway police. Such a system might be effective if the states could be persuaded to enforce compliance. The practicality of such a system probably could not be determined without an extensive test program.

10. Proposals have been discussed that would return responsibility for parts of the Federal-aid program to the states. Under what conditions do you think such a turnback would be workable?

A. In general, states and localities should have the right to decide on levels of expenditures on programs with primarily local benefits, provided they are willing to pay for them with local taxes. A return of taxing and spending decisions to state and local governments will promote economic efficiency and equity by encouraging states and localities to undertake those expenditure programs, including highways, that their residents want and are willing to pay for. In contrast, under a Federal program, residents of localities and states are compelled to pay taxes to support program levels that they might not be willing to support if they had the choice to use their resources in other ways.

Certainly, many highway programs are national in scope and warrant some Federal financial assistance. However, there are areas -- particularly outside of the interstate program -- where there are potential benefits from reducing Federal responsibilities. Any such reductions in Federal spending should be accompanied by matching reductions in Federal highway user taxes, so that states would be able to increase taxes, if their residents want to maintain service levels, without increasing the combined Federal-state tax burden above previous levels. In the long run, allowing more scope for local decisions would cause highway funding decisions to reflect better the diverse needs of different communities.

A turnback of some portion of Federal highway user taxes would be technically workable. However, any decisions to turn back parts of Federal highway-aid programs to the states would impose additional responsibilities on state officials, who would be forced either to raise local taxes explicitly or to accept lower spending levels. Although the reduction in Federal taxes would increase taxpaying capacity, such a transition may impose short run difficulties on the states, and therefore any decisions on turnback proposals will necessarily require coordination and agreement with the states.

11. What do you believe are the administrative and compliance problems with the present heavy vehicle use tax? How much revenue is lost to the Highway Trust Fund by those who avoid paying this tax? Would the percentage of avoidance increase if this tax were significantly increased? How can this problem be remedied?

A. As we discussed in the Second Progress Report, there are problems with the present heavy vehicle use tax. The major problem has been finding ways to identify the population liable for the tax, so as to prevent non-compliance.

We do not have any precise information on how much revenue is lost because of non-compliance with the heavy vehicle use tax. However, the total amount of revenue lost is likely only a small fraction of total revenue flowing to the Highway Trust Fund. There have been several studies in the past of compliance with the use tax; all have shown rates of non-compliance under 10 percent. If non-compliance had been as high as 10 percent in 1981, revenue lost would have been about $26 million, or less than four-tenths of one percent of all revenue allocated to the highway trust fund.

We expect that tax avoidance would increase if the highway use tax were significantly increased. As stated in my testimony and discussed in the Second Progress Report and in questions #5, 6, and 7, the best potential ways of improving enforcement of the highway use tax involve enlisting the cooperation of the states.

12. Several states have successfully implemented a differential gasoline and diesel fuel tax which allows for collection of closer to equal fees per mile from similar-size vehicles. Are the enforcement problems you refer to in your testimony ones the states have been able to resolve?

A. States have been able to ameliorate, but not totally resolve, problems in enforcing the diesel fuel tax by devoting significant resources to searching out cases of evasion. This has involved in many cases strict enforcement measures, including criminal prosecution.

One advantage states have in enforcing a diesel fuels tax is that states can use their highway patrol to pursue trucks and check on where fuel is purchased. However, state enforcement officials acknowledge that they have problems with individuals who substitute home heating oil for taxable diesel fuel.

13. Taxes based on weight and mileage are said by their supporters to be the only tax types capable of tracking the damage responsibility of heavy trucks. Is such a tax one that should be considered at the Federal level?

A. A tax based on both weight and mileage, if it could be successfully enforced, would be the tax best suited to tracking the damage responsibility of heavy trucks. The problem with such a tax is the difficulty in establishing how many miles a truck had been driven during a particular time period. A tax based on weight and mileage has proved to be feasible in a state with limited vehicle entry points, such as Oregon, but would be more difficult to enforce in some other states and at the Federal level.

A tax based on weight and mileage merits study as an option for future consideration. The Treasury Department would not support such a tax, however, until we were more confident that we could develop practical means of enforcement that would be acceptable to the public.

14. Several states have implemented an indexed fuel tax. What is your opinion on indexing?

Indexing would automatically preserve the real tax rate per unit for fuel taxes, and for other excise taxes that are assessed on a unit rather than an ad valorem basis. As a result, indexing would prevent the real amount of tax revenue, per unit of fuel consumed, from declining during a period of inflation.

In some circumstances, indexing has the political benefit of preserving the intended real tax rates that Congress has enacted and preventing automatic unlegislated decreases in real tax rates, as in the case of unit excise taxes, or unlegislated increases in real tax rates, as in the bracket creep that occurs with inflation under the graduated income tax. However, in the case of Federal fuel taxes, the Congress has itself indicated a desire not to bind future Congresses and Administrations to current tax rates by including sunset provisions for all of the highway user taxes. If these sunset provisions are continued, Congress will have to enact new legislation, as has been enacted this past year, to maintain either nominal or real tax rates, even if indexing were in effect.

Whether or not rates are automatically adjusted for inflation, it will still be appropriate for Congress to reconsider every few years whether the revenue from highway user taxes will be sufficient to finance the highway expenditure programs decided upon by the budgetary process. Therefore, I do not believe that indexing Federal fuel taxes will entail major political or economic advantages.

15. The current tax on new truck sales with a gross vehicle weight of 10,000 pounds or more is 10 percent. What would be the effect of an increase in this tax?

In the short run, an increase in the tax on new truck sales would raise the price of new and used trucks and discourage truck production and sales. Such a tax would aggravate the already severely depressed situation in the motor vehicle industry.

Increased taxes on new truck sales may be appropriate as part of an overall change in the structure of highway user taxes if it is decided to increase Federal highway programs. However, the effects of such a tax on the motor vehicles industry should be taken into account as part of any evaluation of whether or not to increase highway user taxes at this time.

16. There is a manufacturer's excise tax of 8 percent imposed on the sale of truck parts and accessories. What would be the effect of an increase in this tax?

A. The purpose of the tax on truck parts and accessories is to prevent manufacturers from evading the excise tax on new truck sales by selling stripped down vehicles and then adding major parts free of tax. Thus, the appropriate rate of tax on parts must depend on the tax rate on new trucks. The effect of increases in the tax on parts and accessories cannot be evaluated separately from the issue of what changes might be occurring in the taxation of truck sales.

17. What effect would increasing only the Federal gas tax have on the equitable distribution of costs among the user classes?

A. Increasing only the Federal gas tax would aggravate the current inequities in the structure of highway user taxes that favor heavy vehicles. While heavy trucks impose about 18 times as much cost on the highway system per mile driven as do automobiles, their fuel consumption per mile is about 4 times greater. Thus, an increase in the gas tax alone would widen the gap between the percentage of highway system taxes paid by heavy vehicles, and the share of highway costs which can be attributed to them.

18. Although gasoline and highway construction costs have soared, the Federal motor tax has remained at 4 cents per gallon for over 20 years. Since the highway program has traditionally been user financed, how can it keep pace with a tax rate imposed in 1959?

A. There is no absolute necessity that the proportion of national income, or the real amount of dollars, allocated to Federal highway programs remain constant over time. During the

1950s and 1960s, the construction of the interstate system was proceeding at a rapid rate. Currently, the system is almost completed and an increased share of Federal highway funds is being allocated to repair and maintenance.

This question poses the issue the wrong way. The issue in determining desired revenue from highway user taxes is how much we as a society want to spend on Federal highway-aid programs, compared to other Federal expenditures, state and local programs, and private goods and services. Any decision to increase spending on Federal highway programs must necessarily reduce resources available for other uses. Once that resource allocation decision has been made by the budget process, highway user taxes can be adjusted to achieve the amount of revenue consistent with the spending decision.

19. The current user charge structure provides for certain exemptions for gasohol, buses, and state and local government and nonprofit educational vehicles. You stated in your testimony that serious consideration is being given to changing some of the exemptions. Can you explain in more detail which exemptions are being considered for change and what form that change would take - a phase-out, tax credit, refund, etc.?

A. As part of its tax proposals for the FY 1982 budget, the Administration recommended replacing the gasohol exemption with an equivalent tax credit, which would then be phased out over time. Since households and business firms now confront world prices for crude oil and gasoline, there is no longer any justification to provide special incentives for forms of energy use that the market will not support. Therefore, our position is that the gasohol exemption should be eliminated, subject to transition rules that would ease the burden on those firms that had invested in production facilities in the expectation that the exemption would be available.

We will also review the appropriateness of continuing to provide exemptions for buses, state and local governments, and nonprofit educational vehicles. These exemptions are not justified from a highway cost allocation viewpoint, since all of these vehicles impose costs on the highway system similar to those imposed by taxable vehicles with similar physical characteristics. One option under consideration is to propose a sunset date on these exemptions, so that they must be reevaluated by Congress at the same time that the current rate structure expires.

20. Would you comment on the present tax exemptions for farm vehicles used off the highways? In particular, do you think there is a problem with tax-exempt fuels being transferred to vehicles that are then operated on the highways? Also, should consideration be given to exempting farm vehicles from the tax?

A. The Treasury Department favors maintaining the present tax exemptions for farm vehicles used off the highways. There is a problem with tax-exempt fuels being transferred to vehicles that are then operated on the highways, but IRS regards the magnitude of this problem to be minor.

Treasury does not support exempting farm vehicles from the use tax. However, if the use tax were to be significantly increased, in line with the cost allocation findings of the Department of Transportation, there would need to be special provisions to prevent excessive taxation of farm vehicles and other vehicles that are not used extensively on public highways. Exemption of farm vehicles from the use tax is one option that might be considered, if the use tax were to be increased. Another possible approach might be a more general refund system for low mileage vehicles.

21. Would there be any additional problems created in collecting and administering the various highway excise taxes if any of them were increased?

A. As has been discussed in the testimony and in responses to other questions, there would be increased problems in collecting and administering the heavy vehicle use tax and the tax on diesel fuel if the rates were increased. The IRS does not anticipate any collection or administrative problems from increasing any of the other highway user taxes.

22. What are the dangers of contributing to further inflation of highway construction costs by significantly increasing the money available for the highway program?

A. We do not anticipate any serious inflationary effects from increasing the money available for the highway program, provided that the program is financed by increased highway user taxes rather than higher deficits funded by expansion of the money supply. However, the Administration is very concerned about the burden of high government spending and taxes on the private sector, and in general strongly favors reducing rather than increasing Federal expenditure programs.

23. How important a concern do you believe equity-based cost allocation to be, and how equitably do you think the costs are assigned among various highway user groups in the DOT study?

A. The Treasury Department regards equity-based cost allocation as an important concern, with the one qualification that changes in the tax structure designed to improve the equity of cost allocation among user groups must not impose undue administrative burdens on taxpayers or the IRS.

On the basis of our review to date, we accept the findings of the DOT on the assignment of costs among highway user groups. However, we would add that the assignment of costs should be equitable among particular consumer and firms within groups, as well as among the defined user groups analyzed in the DOT study.

24. The DOT study found that light trucks overpay while heavy trucks underpay. What is your reaction to the apparent cross subsidies among the truck classses and how might the problem be resolved?

A. Cross-subsidies among user classes are undesirable and any changes in the tax structure should seek to reduce these cross-subsidies. Increasing the share of revenue collected from taxes imposed on heavy trucks, particularly by increasing the diesel fuel tax and by increasing and restructuring the heavy vehicle use tax, would help to alleviate the problem.

As I discussed in my testimony, it is necessary to balance improvements in the equity of the tax structure against potential increases in costs of administration.

25. The American Truck Dealers have complained about the existence of a higher tax on a dealer sale than on a factory sale of an identical vehicle to the same customer. Do you see this as a problem and, if so, how might it be resolved?

A. The issue raised in this question concerns a technical matter of how to compute the constructive sales price for the transfer by a manufacturer to a factory store. Apparently, the American Truck Dealers do not agree with the current method of computing the constructive sales price.

This is an issue which has not come to our attention before. The appropriate way to resolve it, if there is a complaint, is to request a revenue ruling from the Associate Chief Counsel (Technical) at IRS.

26. At what point is each of the excise taxes now collected?

A. The taxes on gasoline, trucks,, trailers, truck parts, tires and tubes, and lubricating oil are collected from manufacturers, producers, and importers.

Diesel and special fuels taxes are collected from retail establishments and, in some cases, the ultimate user.

The highway use tax is collected from the person in whose name the vehicle is registered or required to be registered.

27. George Will wrote in a recent column: "It has been well said that highway maintenance, as much as original construction, is a measure of a society's vitality. It also is a measure of maturity, of the willingness to make timely provision for the future. By this measure, America is increasingly deficient." Do you agree or disagree with Will's statement?

I agree with George Will's assessment of the importance of making timely provisions for the future by maintaining the highway stock, as well as other forms of productive capital in the public and private sectors. In the budget review for FY 1984, the Administration will again examine proposals to increase Federal expenditures on highway programs. In evaluating this issue, consideration should be given not only to the question of how much the Federal government should spend on highways, compared to other programs, but to how the responsibility for highway maintenance should best be divided among the Federal government, state governments, and local governments.

Attachment

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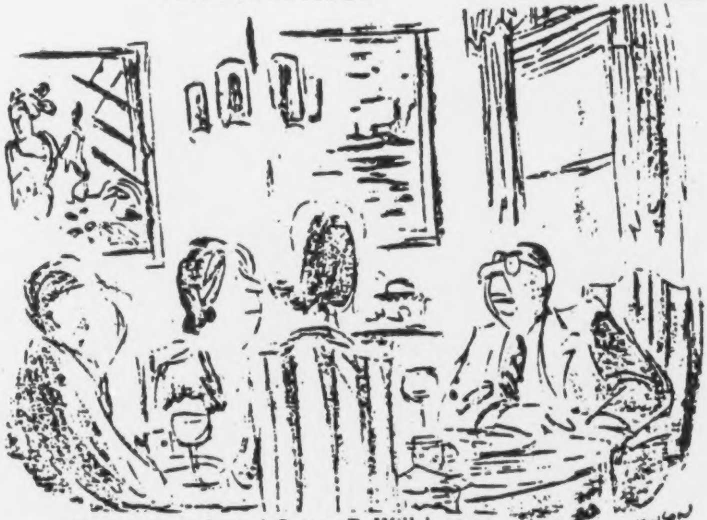

"Well, that's what I think. And George F. Will happens to agree with me a hundred per cent!"